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Pz.Kpfw.38(t) Variations

Charles K. Kliment

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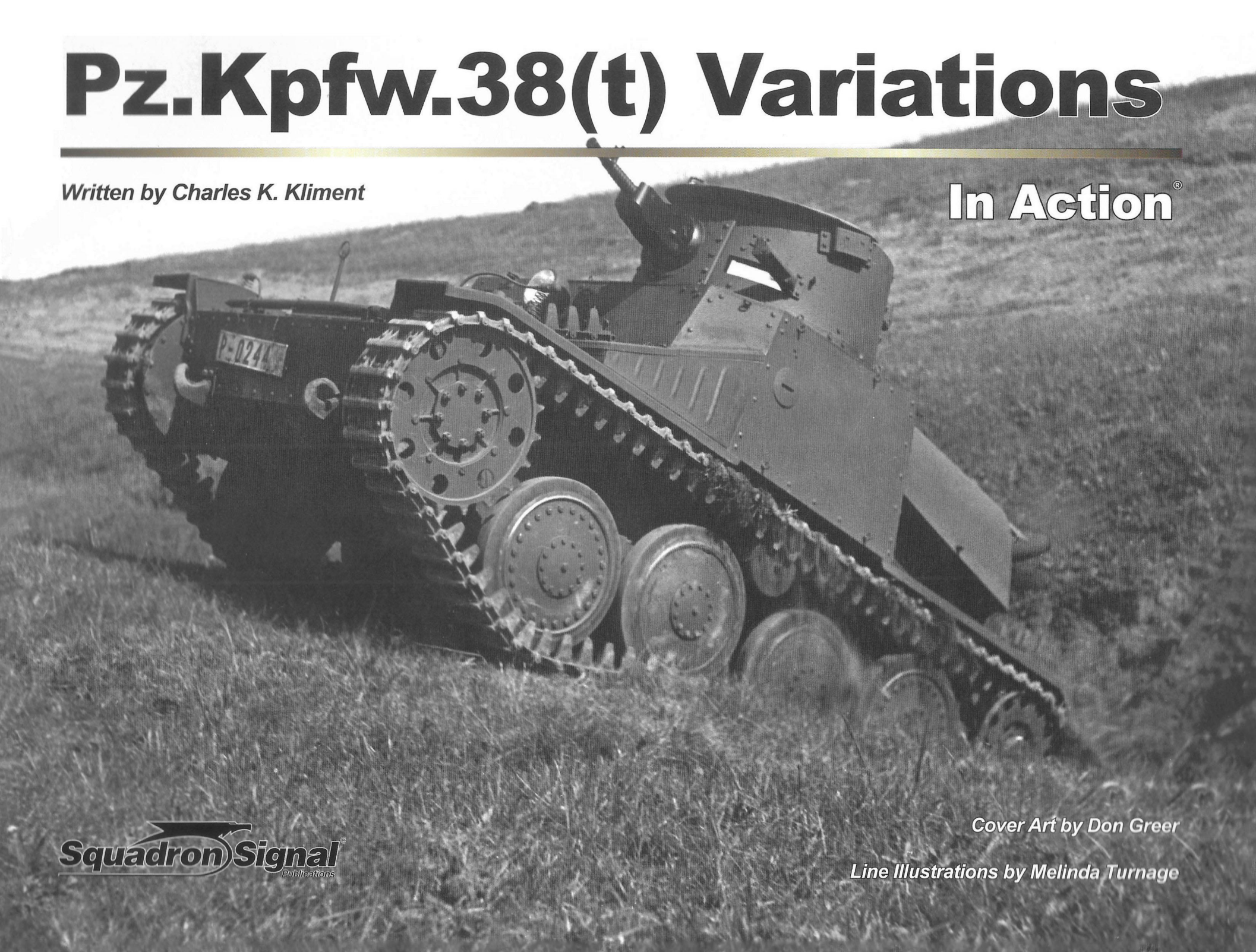
Written by Charles K. Kliment



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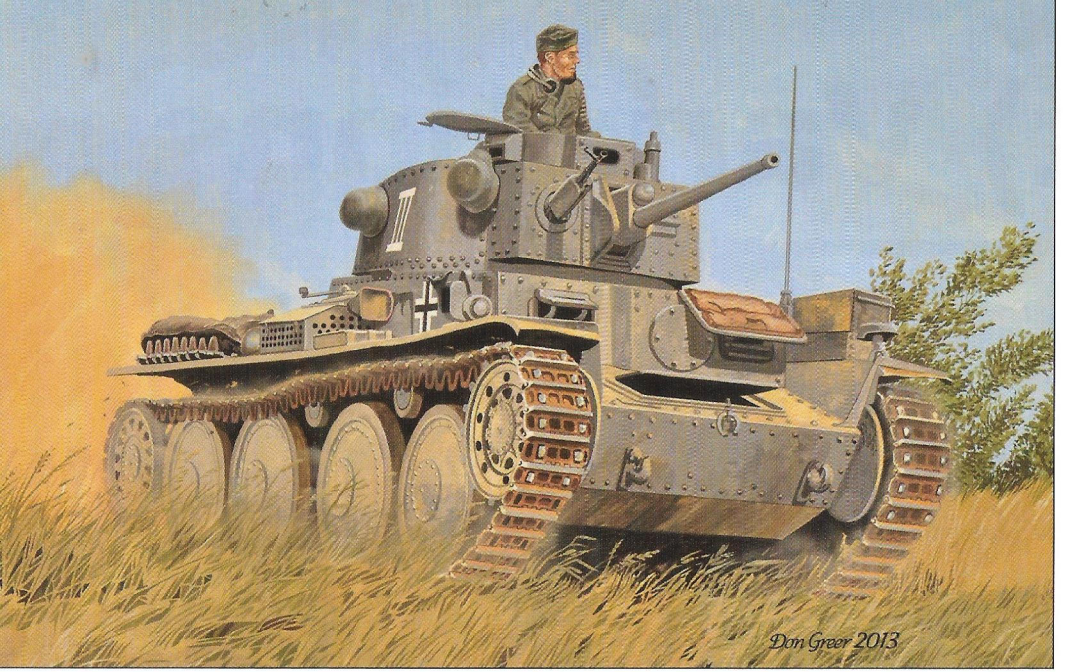
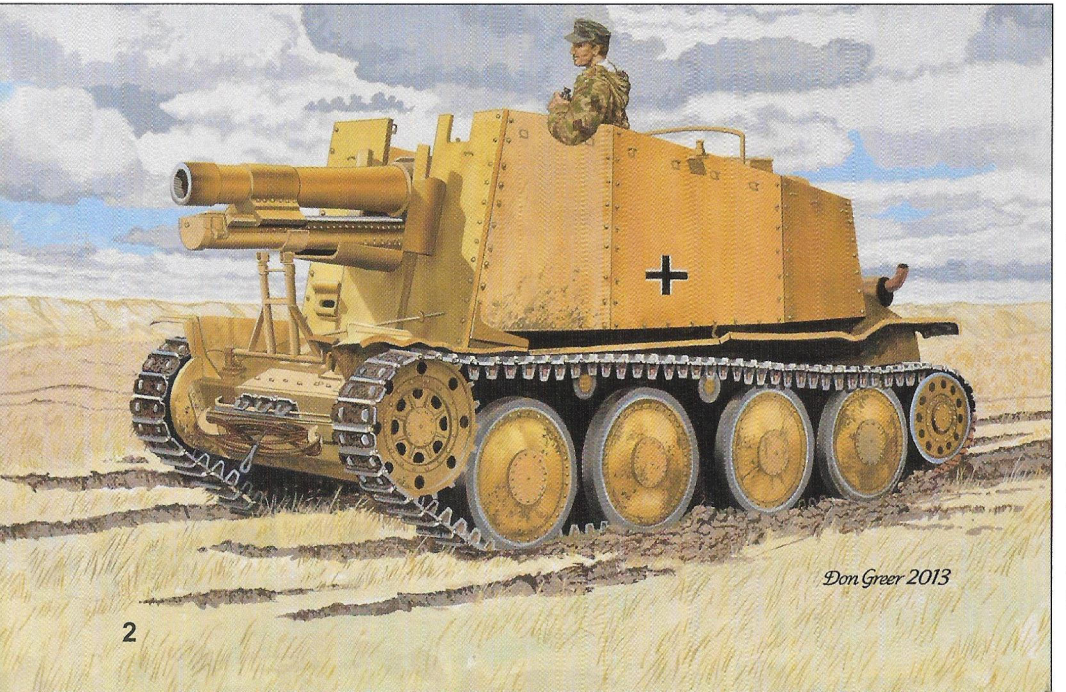


(Front Cover) Triumphantly crushing one of the world's major armies, a Pz.Kpfw.30(t) Ausf.B drives through France in the summer of 1940. The radio operator's hatch is open, as is the cover over the clutches on the front plate. The dust has increased the camouflaging property of the gray paint. The front hull machine gun is removed.

(Back Cover) On what is probably a test run, a 15cm sIG33 (sfl) auf Pz.Kpfw.38(t) "Grille" is painted in basic dark yellow with no recognition signs other than Balken crosses.



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(Title Page) The observation slit on the turret of this AH IV tankette is open. Manufactured for Iran in 1936 and for Romania as R-1 in 1937, the AH IV used the running gear recently employed on the TNH light tanks, and the PRAGA-Wilson gearbox that was later used on the LT vz.38 tanks.

Acknowledgments

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Introduction

The Czech regions, Bohemia and Moravia, served as the arms manufacturers for the Austro-Hungarian army before and during the First World War. The formation of Czechoslovakia in 1918 left them with great production capacity, but a need to find new markets. The Czechoslovak army became their first customer, but they were also heavily engaged in export. In the 1930s, reports of the League of Nations listed Czechoslovakia among the world's leading armament exporters.

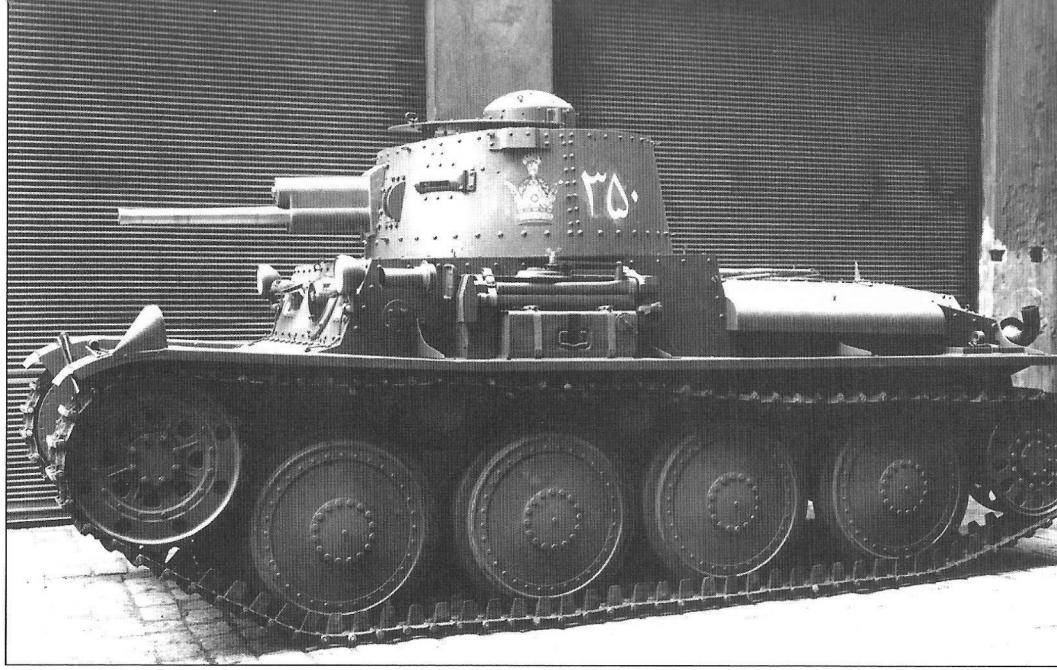
Czechoslovakia's main arms manufacturer – Škoda in Plzeň (Pilsen) – exported its guns all over the globe. It also made trucks, armored cars, and armored trains for the Czechoslovak army. The second company, ČKD in Prague, manufactured various types of machinery, electrical installations, locomotives, and automobiles. For the Czechoslovak army it produced searchlights, aircraft engines, and fully tracked artillery tractors.

In 1928, ČKD was working on new tank designs under the direction of the head of its construction department, Dipl.Eng. Alexej Surin, a Russian émigré who had studied both in Russia and in Czechoslovakia, and was a gifted tank designer. When ČKD lost the light tank competition to Škoda in 1935, he concentrated on the development of the AH-IV tankette and the TNH light tank. The simple yet rugged AH-IV had a weight of 4 tons, 15mm armor, and with its six-cylinder PRAGA engine, it had a maximum speed of 45km/hour and good cross-country performance. Its radius of action was 250km, and it was armed with one heavy and one light machine gun. A license for the heavy ZB vz.35 machine gun used in the turret was later sold to Britain, which used the weapon, under the name BESA, as secondary armament in all British tanks. The AH-IV's light machine gun, ZB vz.26, was later produced under license by the British as the BREN. AH-IV tankettes were successfully exported to Iran in 1936 (50 vehicles), to Romania in 1937 (35 vehicles), and to Sweden in 1937 (48 vehicles). Only the Romanian vehicles saw war duty, but they were effective on the Eastern front, and some survived up to 1945.

A logical development of the AH-IV tankettes was the TNH series of light tanks. Introduced in 1935, they carried a 3.7cm Škoda tank cannon and two ZB vz.35 heavy machine guns. The tanks were built according to the buyers' specifications. Their weight, depending on the armor and equipment, varied from 7.2 to 8.8 tons, with maximum armor thickness being between 25mm and 32mm. They carried the new PRAGA six-cylinder engine of 7,150cc displacement, which developed 125 h.p. at 2,200 r.p.m. The tanks had a maximum speed of 50km/hour and an action radius between 200km and 250km. These relatively small tanks (only 4.5m long and slightly over 2m wide) were, however, very rugged and carried a crew of three.

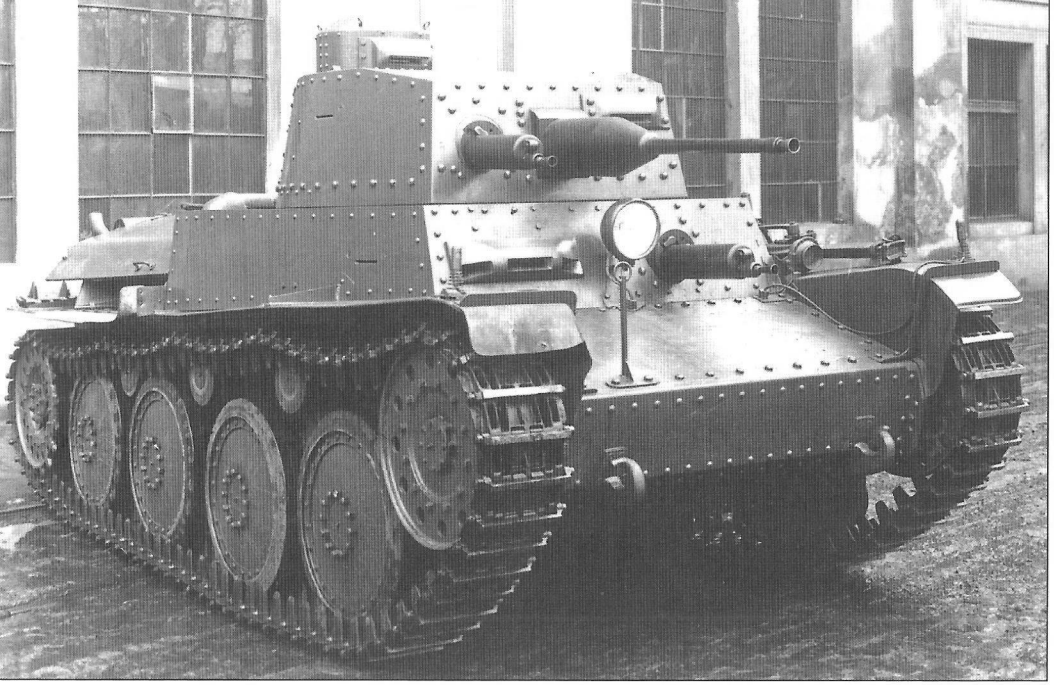
The first 50 TNH tanks were ordered by Iran and delivered in 1937 in a tropicalized version. Peru bought 24 vehicles of the LTP version in 1938 and Switzerland 24 LTH tanks in 1937. These had Sauer-Aarbon diesel engines and Oerlikon 2.4cm cannons.

In 1938 the Czechoslovak army announced a competition for a new light tank to replace the Škoda LT vz.35 light tank. The improved TNH model easily won the army competition, and was accepted by the army as light tank LT vz.38. The Czechoslovak army immediately ordered 150 vehicles, planned to be delivered by May 1939. After the Munich



This TNH tank, already wearing Iranian markings, is ready for delivery to the Shah's army in Iran. Ordered in 1935, it was the first of the very successful export series of ČKD's light tanks. It carried a 3.7cm gun, but its armor was only 15mm thick.

Built for Peru, this LTP has its recoil cylinder but, as yet, no gun. These tanks were the first to use the Scania-Vabis engine and were designed for service in mountains as high as 4,500 meters. A very successful model, it served the Peruvian army until 1988.



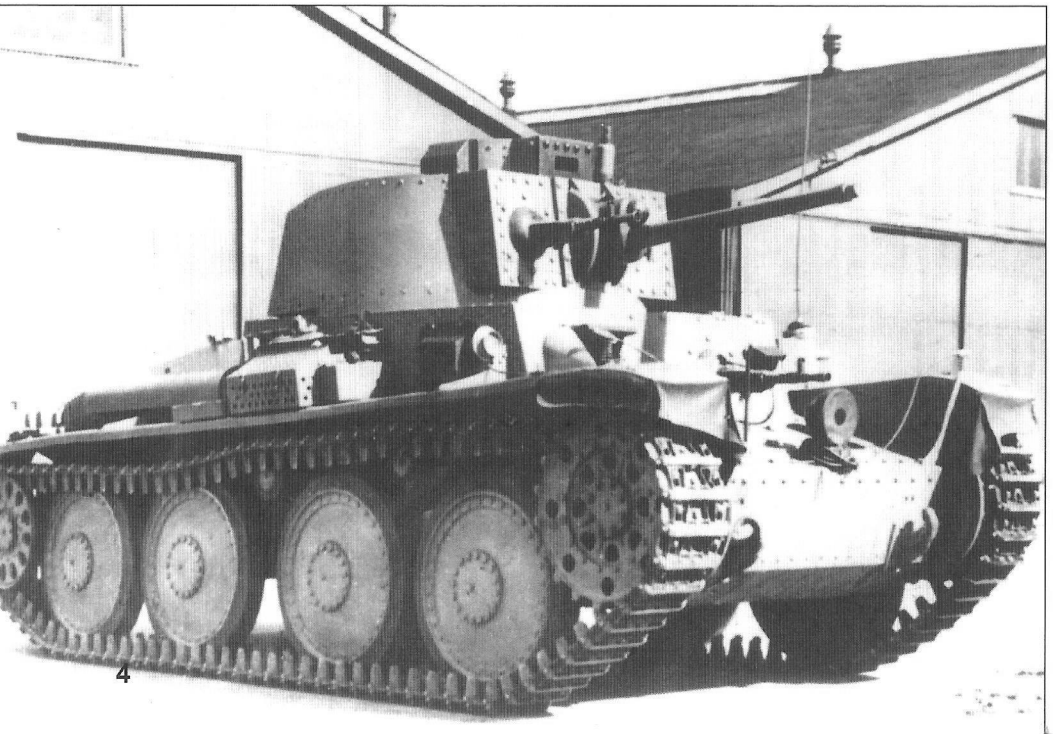
The Swiss army LTH uses a Swiss gun and machine guns. The first 12 tanks came with the Scania-Vabis engines, but the last 12 received Swiss Saurer-Arbon Diesel engines.

The LT 38 prototype was tested in the Mechanical Experimental Establishment of the British Army in Farnborough.

agreement was imposed on Czechoslovakia, however, all emergency appropriations were revoked and production slowed considerably. The first 15 tanks were finished only after the German occupation on 15 March 1939.

This excellent Czech light tank, developed to fight against the Wehrmacht, fought in German ranks for the whole war, first as a tank, later as a carrier of antitank guns, howitzers, antiaircraft guns, and finally as the tank hunter Hetzer. Its construction was so advanced that in 1944 Adolf Hitler decreed that all new construction would be designed on two chassis only – the Panther's for heavy vehicles and LT 38 for light ones.

The LT vz.38 was shipped to England on 28 February 1939 and tested by the Mechanical Experimental Establishment of the British army in Farnborough. Between 17 and 29 March, evaluators ran the tanks over 291 miles, 104 of them on heavy terrain, and found no defects. The tank's maneuverability was acceptable, and the driving easy. In their final evaluation, however, the British experts seemed unimpressed: "The attempt to produce an inconspicuous machine with observation arrangements immune from bullet attacks has resulted in a cramped fighting machine with control inferior to our standards." This assessment of what some believed to be the world's best light tank perhaps revealed more about the British experts' fixed expectations than it did about the tank itself, which soon would come to plague British forces.



In an irony of fate, a tank designed to fight the Germans served the Wehrmacht and chased British and French armor all over France in 1940. The German crews originally wore berets with their black uniforms. The black uniforms mimicked the elite "Black Hussars" regiment of Friedrich the Great, but the black color also conveniently hid oil and other spots.

Development

The new tank had a Praga TNHP engine (license built Swedish Scania-Vabis 1664) with 7,754cc displacement and output of 126 h.p. at 2,200 r.p.m. Another improvement was the excellent PRAGA-Wilson gearbox (a license-built Rolls-Royce Wilson gearbox, improved by PRAGA), which facilitated very smooth driving with minimum exertion of the driver. The engine was in the rear of the vehicle; the gearbox, clutches, brakes, and the steering mechanisms up front. This arrangement brought simplicity of installation and easy access to all parts.

The resulting vehicle effectively balanced the factors of armor, armament, and speed, and was very compact. Rugged and simple, it needed minimum upkeep and maintenance. Many experts regard the LT 38 as one of the two outstanding tank designs of the Second World War, the other being the Soviet T-34.

The LT 38 was small, but was surprisingly roomy inside. The new turret carried a high-quality Škoda tank gun and a coaxial ZB vz.37 heavy machine gun. Another such machine gun was located in the front plate in front of the radio operator.

The Czechoslovak army ordered 150 vehicles on 22 July 1938 and production was to start immediately, because the army had only half of the number of light tanks required by its mobilization tables. The delivery of the first 20 vehicles was planned for November 1938, and the remaining 130 during the first quarter of 1939. Because of the Munich agreement, signed in September 1938, the army postponed delivery dates and as a result, the first 10 vehicles were ready only after Germany had occupied the Czech lands in March 1939.

The Germans started confiscating tanks of the Czechoslovak Army immediately after 15 March 1939, but it took them a little longer to venture into the factories. The Waffenamt (Armament Office) sent a commission of high representatives to ČKD on 2 May 1939 to see how this company could help with arming the Wehrmacht. The group of five officers was shown in the yard and on the testing track a wide range of Praga tank types, and they also saw the first 10 finished LT vz.38 tanks.

The Germans recognized an outstanding design when they saw one. Following their occupation of Prague, their military commission found in ČKD, to its surprise, an almost finished production run of 150 tanks LT vz.38. The Wehrmacht had not known about this type, but the German armor specialists immediately recognized the quality of the produced tanks.

The Germans, who consistently preferred domestic construction for their armored vehicles, acknowledged the high quality of the design, and made an exception without hesitation. ČKD delivered the last tank of this series by 23 November 1939. The tanks were originally designated L.T.M.38 (Leichte Tank Muster 38), but from January 1940 this designation was changed to Pz.Kpfw.38(t) (Panzer Kampfwagen 38 tschechisch).

The production of the Pz.Kpfw.38(t) lasted up to July 1942. A total of 1,396 tanks of eight modifications (Ausführung A, B, C, D, E, F, S, and G) were produced, plus 37 tanks for the Slovak army. ČKD sold to the Wehrmacht each tank for 56,000 Reichsmark. For comparison, the Wehrmacht paid for each Pz.Kpfw.III 100,000 Reichsmark.

The second Panzerbefehlswagen 38(t), SdKfz 267, an example of which is here part of a column of Pz.Kpfw.38(t) vehicles during the French campaign in summer 1940, was intended for regimental and divisional headquarters, and had Fu5 and Fu8 radio sets with the large frame aerial. Its main gun was removed and replaced with a wooden mock-up. Both command versions carried a gyrocompass for navigation.

The small size of the Ausf.A is evident when compared to an adjacent horse; the tank was about the size of Pz.Kpfw.II.

This PzKpfw 38(t) Ausf B serves the 8th Panzer Division in the northern sector of the Eastern front in summer 1941. The plated-over bow machine gun position indicates that this is a command vehicle. The second rod antenna is probably behind the crewmen.

This Slovak Army vehicle shows the removable headlight, which could have been used also as a spotlight or work lamp, and which was the standard equipment of both the original Czech version and the German version.

This Pz.Kpfw.38(t) taking part in the French campaign in the summer of 1940 carries a lot of extra equipment and a German flag on the turret's top for aerial recognition.

Not only combat tanks were manufactured with Fu5 radio sets for the Wehrmacht, but also two types of Panzerbefehlswagen 38(t) command tanks. The first model, SdKfz 266, was for company and battalion commanders and carried Fu5 and Fu6 radio sets and two rod aerials.

Production of Pz.Kpfw.38(t)

Series	Ausführung (type)	Fahrgestell no. (chassis no.)	Number produced	Production dates
I	A	0001-0150	150	May-November 1939
II	B	0151-0260	110	January-May 1940
III	C	0261-0370	110	May-August 1940
IV	D	0371-0475	110	September-Nov.1940
V	E	0476-0750	275	November 1940-May 1941
VI	F	0751-1000	250	May-October1941
	S	1001-1090	90	May-September1941
VII	G	1101-1600	500	October 1941-July 1942

Pz.Kpfw.38(t) Ausf.A

The Pz.Kpfw.38(t) Ausf. A was 4.60m long, 2.12m wide, and 2.40m high. Its fully loaded weight was 9.4 tons. Its ground pressure was low, only 0.5kg/cm². The Germans added a fourth crew member – a gunner, so the crew consisted of commander and gunner in the turret, and driver and radio operator up front.

The hull and the turret were assembled from L-shaped steel profiles, to which were riveted flat armor plates. The front plates of the hull and the turret were 25mm thick, angled plates were 15mm thick, and plates angled more than 30° were only 12mm thick. Both the hull and turret top plates were only 8mm thick. The 25mm plates were impenetrable to armor-piercing rounds of the 2.0cm Oerlikon gun from 250m and more; the 25mm and 15mm plates could withstand vz.31 armor-piercing machine gun and rifle rounds at any distance.

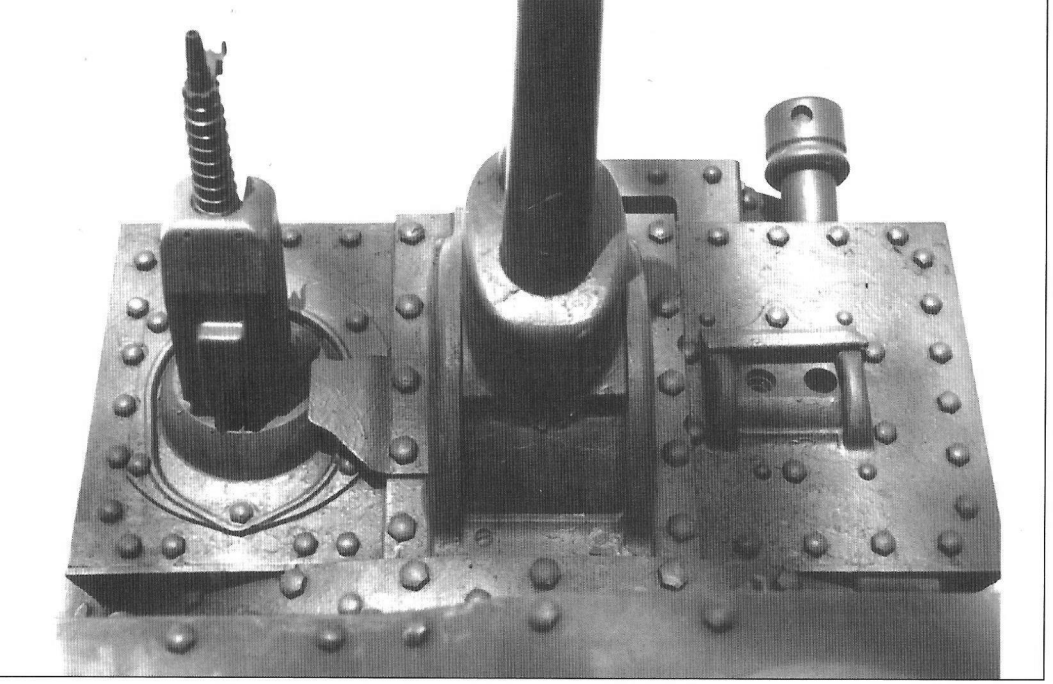
A 5mm thick firewall divided the hull into fighting and engine compartments. Two solid doors in the firewall allowed access to important engine parts from inside the fighting compartment. The firewall was lined with asbestos on the engine's side.

The driver and the radio operator sat in the front part of the hull, the driver on the right side (in the pre-war Czechoslovakia the driving was on the left). He had in the front plate a 203mm x 82mm observation visor with a rotating episcope that could be fixed in any position. The observation visor was protected from outside by an armored shutter 28mm thick, and with a 130mm x 4mm observation slot, protected from inside with a bulletproof glass 50mm thick. In the right side armor plate, the driver had a smaller vision slit 120mm x 3mm, similarly protected with a bulletproof glass.

The radio operator had his own, smaller observation visor. The armored cover in its closed position formed an observation slit protected by a bulletproof glass 50mm thick. All the observation devices were equipped with upholstered leather-covered headrests. Reserve episcopes and bulletproof glass blocks were carried in protected containers.

The machine gun was on the left part of the front plate in a ball mount, which allowed

Still bearing the remnants of white winter camouflage, this PzKpfw 38(t) Ausf C is serving the Germans in occupied Soviet territory in the early spring of 1942. A coating of mud on the hull and chassis has completely covered the original dark gray paint.



The gun is in the middle of the front of the turret. To its right is the coaxial machine gun. On the left is the opening for the gun's spotting scope. Massive bolts dot the armor.

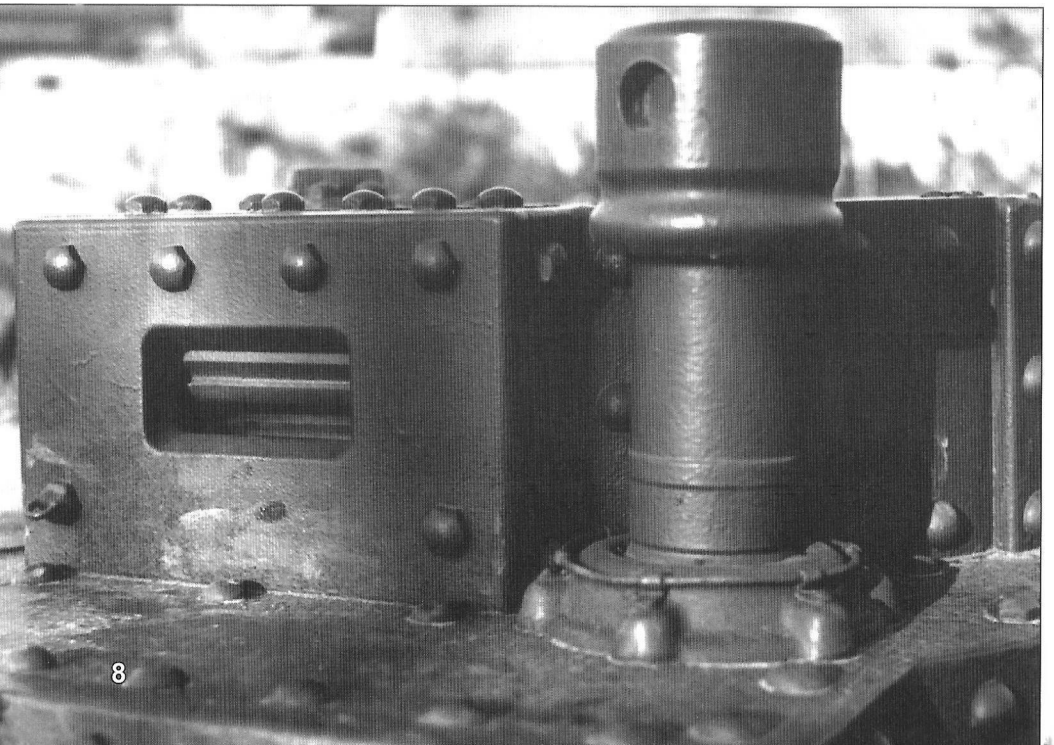
The rotating monocular periscope is next to the commander's cupola with its front episcope.

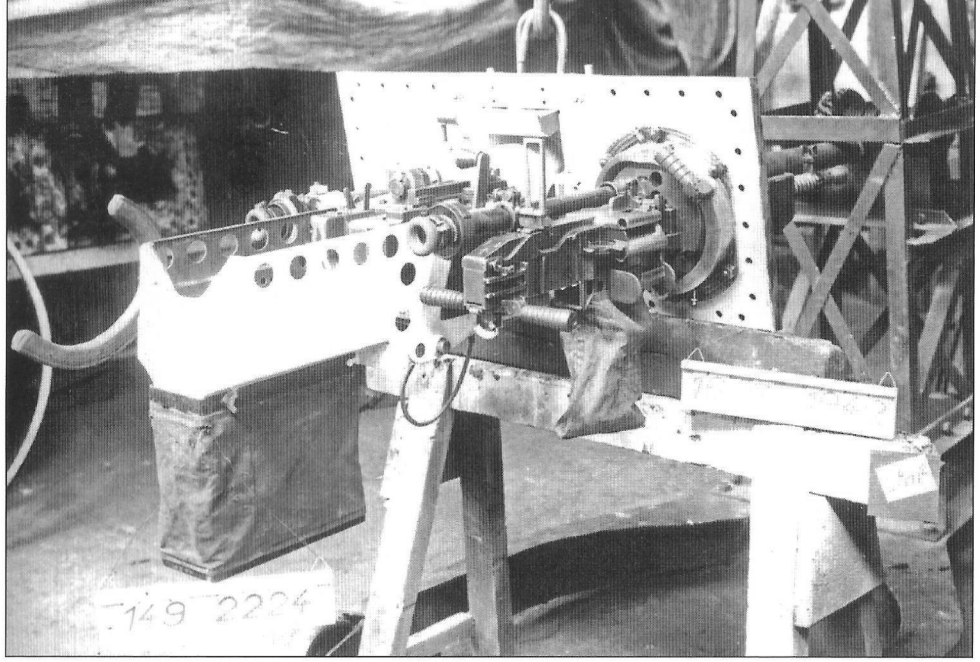
a 28° field of fire, with elevation and depression of 10°. The machine gun had a spotting scope, but could be also fired over open sights, built into the driver's visor and on the front plate. If necessary, the driver could lock the gun in central position and fire using a Bowden cable. In such a case, the gun was sighted to hit the road 300m in front of the vehicle. Escape from the fighting compartment was through the radio operator's hatch or through the commander's cupola.

The fully rotating turret sat in a ball-bearing ring, 1,265mm in diameter, in the top plate of the fighting compartment. It was constructed the same way as the hull. In the center of the straight, 25mm front plate was the main gun, and to its right was the machine gun in a ball mount. The turret's sides were made of slightly curved 15mm armor plate. The upper plate was only 8mm thick.

The commander's cupola with an inside diameter of 570mm was located on the left side of the upper plate. Its sides were 15mm thick and the hatch 8mm. It was provided with four episcopes, on the front, sides, and rear. The front episcope could rotate along its vertical axis. The commander also had at his disposal a rotating monocular mirror periscope in its own armored protective mount, placed on the front plate in front of the cupola. Its field of view was 20° and the enlargement was 2.6x. The cupola's top plate had two small openings for using the signal flags during the day, and a special signal lamp during the night. These openings were covered with armored flaps when not in use.

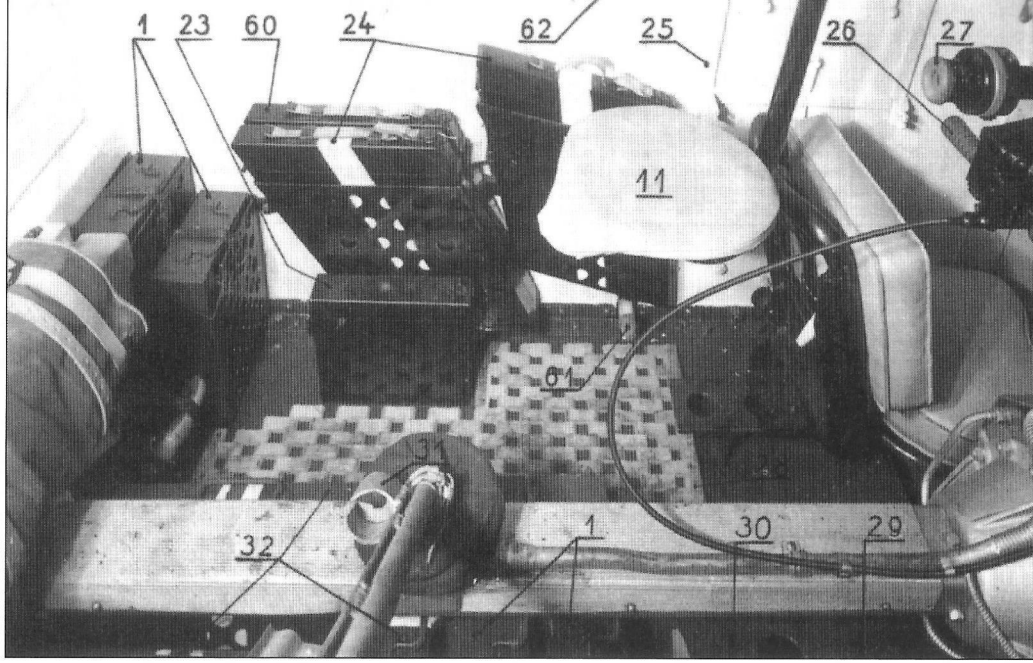
Two of Pz.Kpfw.38(t) vehicles take part in operations in occupied Soviet territory in the summer of 1941. Both vehicles carry considerable extra equipment outside as was usual on the long matches. The box added on the rear fender of the rear tank was used to carry a blow-torch that helped start the engine in cold temperatures.





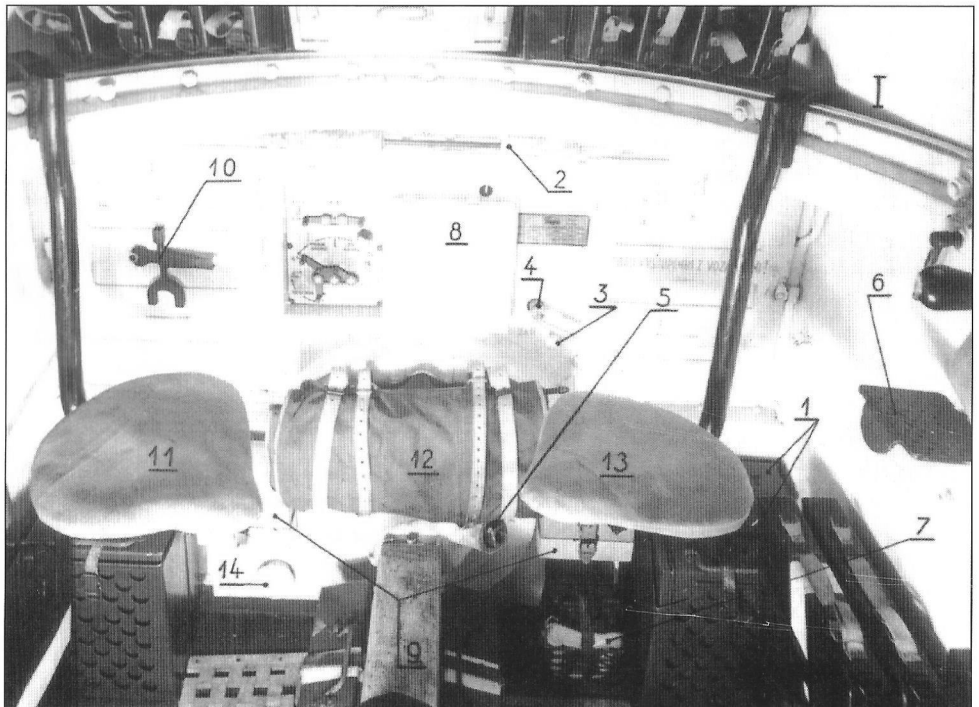
Front plate of the turret is seen with the gun and the coaxial machine gun. They have their own spotting scopes. The gun has a recoil protector and leather bag for catching spent cartridges. On the rear left is the shoulder pad for the gunner.

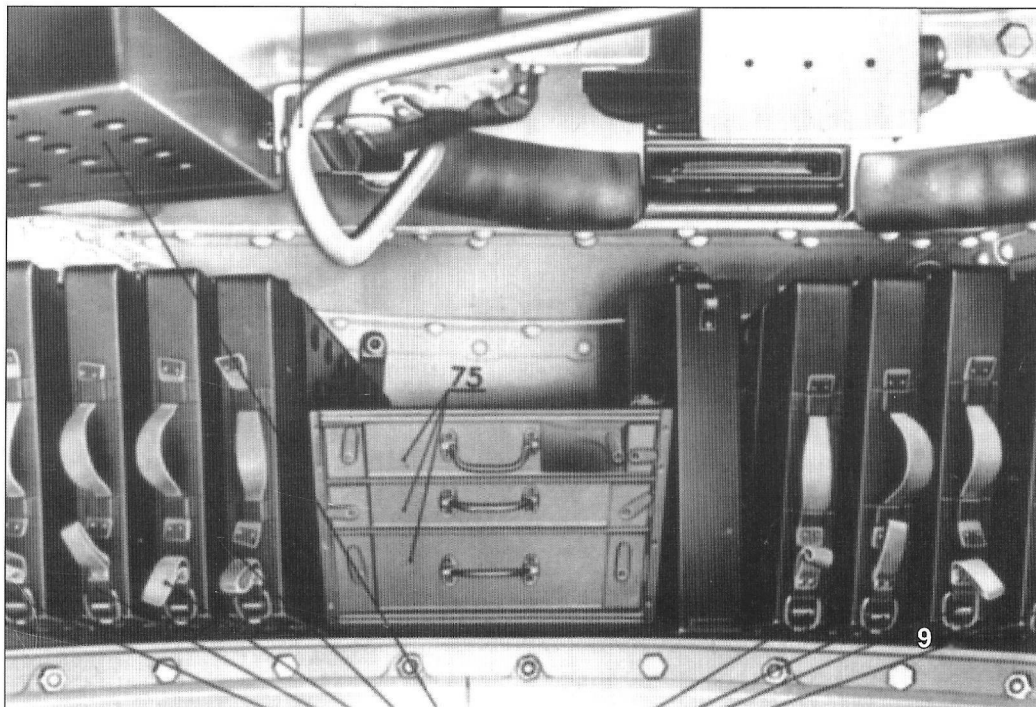
The adjustable seats of the commander and the gunner are suspended from the turret wall at the rear of the fighting compartment. In the fire wall are access doors with ventilation windows, here in the closed position.



To the right in this image of the left side of the fighting compartment are the handles and the spotting scope of the machine gun. The Bowden cable allowed the driver to fire the gun. On the wall are metal boxes with gun and machine gun ammunition. The canvas bag strapped to the wall (at left) contains engine spare parts and tools.

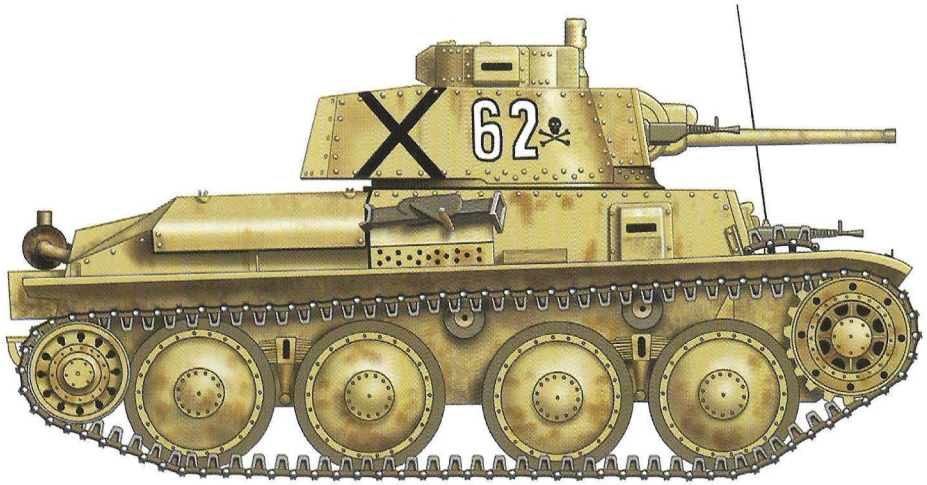
Metal boxes with gun ammunition are seen in this view of the turret's overhang. In the center is a wooden box containing tools for gun repair.





A column of Pz.Kpfw.38(t)s rolls through occupied Soviet territory. The front tank is an Ausf.A with the staggered front plate, and carries on the front a rubber tire for the running wheel. That practice was rare; usually whole replacement wheels were carried.

A Bulgarian "lek tank Praga" from the 9th company of the tank brigade, which participated in fighting against the Wehrmacht in 1944. The national insignia were carried not only on the sides of the turret, but also on the front plate and on the engine's cover. The call numbers and unit's insignia were carried only on the sides of the turret.



Drive Train

The Pz.Kpfw.38(t) was powered by an internal combustion, water cooled, four-stroke, six-cylinder engine with a rated output of 130 h.p. (95.5 kW) at 2,200 r.p.m. The engine, whose displacement was 7,754cc, could run on gasoline and gasoline/alcohol blends. It was equipped with a Solex "Tous Terrain" carburetor, accessible from the fighting compartment. Fuel was supplied by two pumps, one mechanical membrane and one electrical (Autopulse). Two fuel tanks, each with a capacity of 110 liters, flanked both sides of the engine on the bottom of the engine compartment. Their placement was designed to assure that in case of a hit they would blow outside the engine's compartment and would not force the burning fuel into the crew compartment. The engine was started by a Bosch starter, but it could be also hand-cranked both from outside and from inside the fighting compartment.

A water pump circulated cooling water through a radiator at the rear of the engine compartment. The cooling fan, powered by the engine, drew the cooling air through the slits in the engine covers, across the radiator, and exhausted it to the rear top. Exhaust gases were led into a cylindrical muffler, situated on the top of the engine compartment's back plate.

The engine was equipped with a massive flywheel and a spring-loaded sliding clutch that prevented transfer of sudden engine surges to the gearbox. The Cardan shaft between the engine and the gearbox was interrupted by a special vibration-dampening clutch. The PRAGA-Wilson gearbox was of a planetary type and had five gears forward (speeds ranging from 4.1km/hour in first gear to 42km/hour in the fifth gear) and one backward (6.1km/hour). It had a gears pre-selector. The driver selected the next gear, which was engaged when he depressed the clutch pedal. The outer "crown" cog wheels were braked by belt brakes on their circumference. The brakes were provided with automatic alignment, assuring constant pressure even with worn lining. The gearbox was lubricated by the engine oil, which was circulated by three pumps through a cooler, a special filter, and back to the engine.

The gear selection was extremely simple. Before starting the engine, the gear selector had to be in neutral, and the clutch pedal depressed once. This assured that no gear was engaged. Once the engine was running, the driver selected the first gear, depressed the clutch pedal and the tank started moving. When stopping, the selector was placed in neutral and by depressing the pedal the gear was disengaged.

Two horizontally mounted levers were used to steer the vehicle. When they were in the front position, the brakes were disengaged, the clutches were engaged, and the tank moved in a straight line. By pulling the steering lever back, the driver disengaged the clutch and engaged the first brake. This action activated the planetary gear of the differential, which lowered the speed of the corresponding sprocket and track. By pulling both levers back, the driver only lowered the speed, but did not the change the direction of travel. Pulling a steering lever back and depressing a push button on its end engaged a second brake, acting on the drive shaft. This action stopped the affected driving sprocket, and the tank pivoted on the spot around the stopped track.

Chassis

The running gear consisted of two tracks, stretched over front driving and rear idler sprockets, running wheels, and return rollers. Each track was composed of 94 links, each 293mm wide and 104mm long. The links were manufactured from hard manganese steel. The drive sprockets were 637mm in diameter, and each of the sprockets' two outer rings had 19 teeth that engaged with slots in the track links. Each track link had two guide lugs, which centered the track on the outside of the running wheels. The track links were connected with link pins, manufactured from tough steel. Spring clips secured the pins in the links. This arrangement allowed faster change of damaged track links and pins. Grousers could be attached to the track links to help cope with especially difficult terrain.

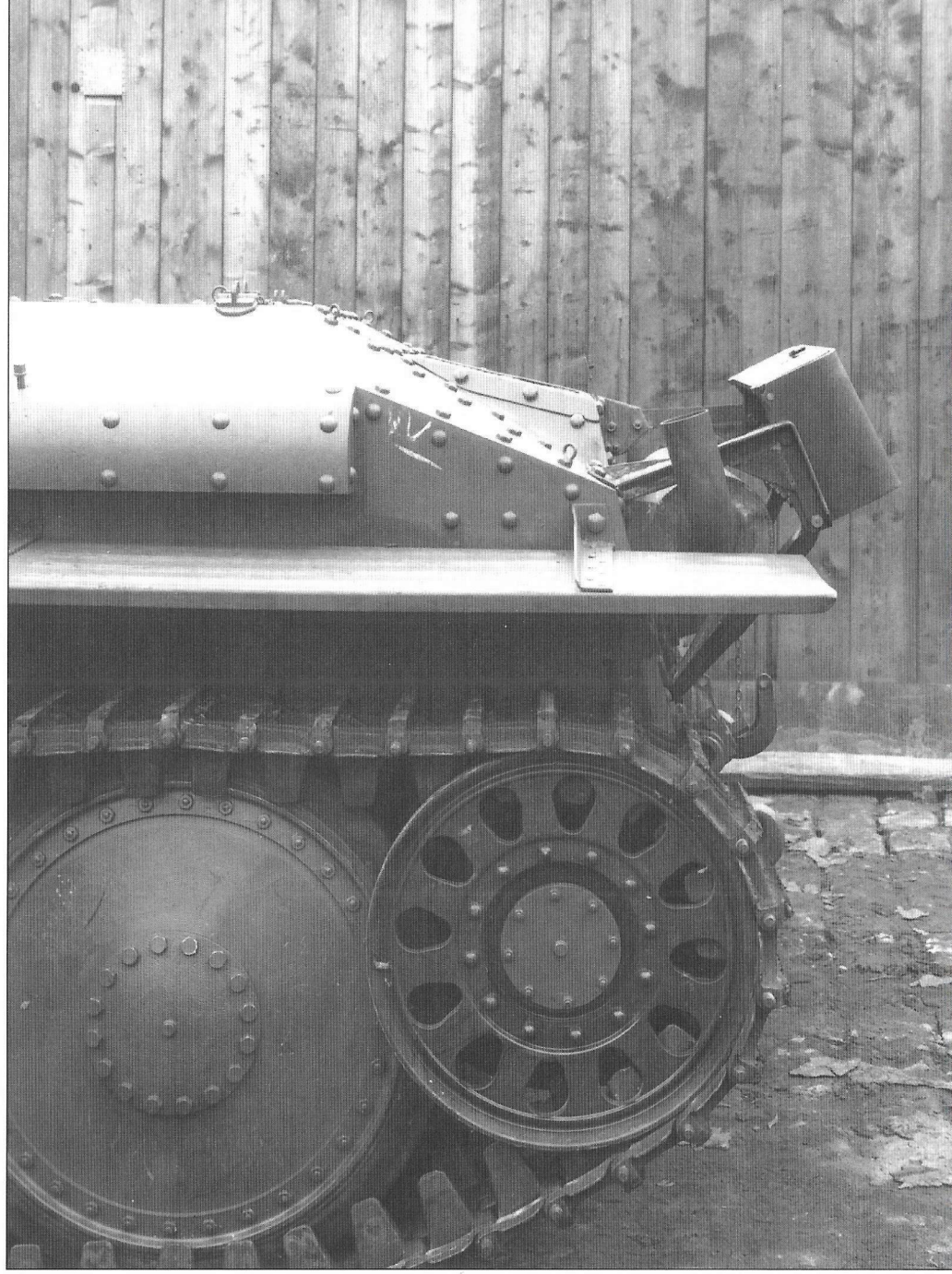
The track was supported by running wheels, four on each side. They were rubber tired and contacted the track between the guiding lugs. Each wheel was covered with an armored dish. Two pairs of wheels were fastened on a common wheel carrier and were sprung with leaf spring clusters. There were two wheel carriers on each side. Two return rollers on each side were also rubber tired. This system provided an excellent cross-country performance and reasonably comfortable ride. The tank could cross a ditch 2.10m wide, climb a 0.8m high obstacle, wade in water up to 90cm deep and uproot trees of up to 0.3m in diameter.

Exterior and Interior Equipment

In the front part of the fighting compartment, the driver and the radio operator sat on upholstered leather seats. Both the position of the seats and the angle of their back could be easily adjusted. Located on the left side of the hull was the Wehrmacht's standard Fu5 phonic radio set.

To the right of the driver was a panel with three colored lights (red, green, and blue) for contact with the commander, who had a similar panel and buttons in the turret. The Wehrmacht replaced this primitive system with its standard intercom. All crew members were connected by cables to a central box next to the radio set, and communicated using a throat microphone and headphones.

The fighting compartment was illuminated by three lamps, one above the driver's panel, one on the firewall, and one in the turret. Outside lighting consisted of two contour 5W lamps in metal casings, mounted on the front fenders. Another such lamp illuminated the rear number plate. The tank also carried a 50/35W headlight on the front plate between the visors. The Germans installed additional lighting as well. A NOTEK light for night driving was fitted on the front left fender. The rear plate light was eliminated and replaced on the left with a rear distance light (Abstand Rücklicht) and on the right with an accessory rear red light (Zusatz Schlußlicht). This lighting was standard on all Wehrmacht vehicles and was manufactured by Nove-Technik in Munich. From October 1941, the accessory rear light was replaced by a rear brake light (Bremseschlußlicht DIN 72624FL).



A close-up view of the rear of Pz.Kpfw.38(t) shows detail of the track, running and idler wheels. On the rear plate is the exhaust's muffler and above it a box with smoke candles. On later vehicles, it was placed below the muffler, which was moved to the top of the rear plate.

A Pz.Kpfw.38(t) and Pz.Kpfw.III are parked on a dirt road in occupied Soviet territory. Crews and engines suffered from the excessive dust raised by the moving Panzers.

Another Pz.Kpfw.38(t), already Ausf. E, drives through the USSR. For Operation Barbarossa – the invasion of the Soviet Union – the Wehrmacht had 834 of these tanks organized in six Panzer divisions (6th, 7th, 8th,12th, 19th, and 20th).

The fighting compartment under the turret had enough room for the commander and gunner. Most of the 90 rounds carried were stored in the turret's rear part in eight six-round metal magazines. The magazines for the 30 armor piercing (AP) rounds were marked with a 5cm wide white band. The rest of the gun ammunition and most of the machine gun ammunition were stored on the sides and on the floor under the turret. Spare parts and tools for gun repair were carried in a wooden box in the rear of the turret, while a canvas bag with engine tools was stored on the floor in the rear of the fighting compartment between the commander's and gunner's seats. There was a fire extinguisher on the right-hand wall under the turret. On the floor behind the driver's and radio operator's seats were two boxes containing machine gun ammunition (2 x 300 rounds). A total of 2,700 rounds for the machine guns were carried in nine boxes; three of them with armor-piercing rounds were again marked with a white band.

Larger tools were carried outside the hull. On the left hull side above the fender were attached a shovel, pick, and an iron crowbar. An eight-ton jack and the wrench for track tensioning were carried on the right side under the turret. On the rear of the right fender were two spare track links and on the left fender was a wooden block for jack support. A towing cable was carried either on the left side, coiled on the shovel, or on the rear of the hull. The tank was equipped with four towing hooks. All were 600mm above ground and all had the capacity of five tons. A fifth towing hook with two-ton capacity was stowed in the middle of the rear plate.

Pz.Kpfw.38(t) with accompanying infantry prepare to probe forward. The closed tank and the infantry huddling behind it signify the proximity of enemy. This twilight photo was clearly taken in the fall of 1941, because the trees are without leaves and the infantrymen are wearing long coats.

Armament

The Pz.Kpfw.38(t) carried in its turret the new Škoda 3.7cm gun ÚV vz.38 and a coaxial 7.92mm heavy machine gun ZB vz.37. Both weapons had a 360° field of fire, with a 25° elevation and 10° depression. The gun penetrated a vertical cemented armor plate 50mm thick at 500 meters, and a 30mm armor plate at 30° at 900 meters. The semiautomatic breech mechanism allowed a relatively high rate of fire, up to 15 rounds per minute. The range was 4,000 meters with a high-explosive (HE) round, 1,500 meters with the AP round.

Beside the main gun, the tank carried two heavy machine guns, made by Československá Zbrojovka in Brno. Both were mounted in special ball mounts. The turret machine gun could be fired coaxially with the main gun or separately. All the weapons were aimed through spotting scopes with 2.6 x enlargement and 25° observation field. The turret scope had distance scales both for the main gun and the machine gun. The gun scope was scaled to 2,000 meters, the machine gun scopes to 1,500 meters. In case of damage to the turret scope, the gun could be aimed up to 600 meters over an open sight by opening an armored cover in the front plate of the turret. The machine guns could use open sights after removing steel plugs in the ball mounts.

The turret was rotated in two ways: by turning the wheel on the rotating mechanism (one revolution corresponded to a 3° turn), or by moving the turret manually by pushing on the main gun's shoulder pad after disconnecting the rotating mechanism. An arresting gear stopped the turret in any position.

Pz.Kpfw.38(t) Ausf.B

Manufactured from January to May 1940, Ausf. B featured minor changes in external stowage. Some vehicles carried smoke projectors in the rear. The cover of the gun spotting scope was slightly modified.

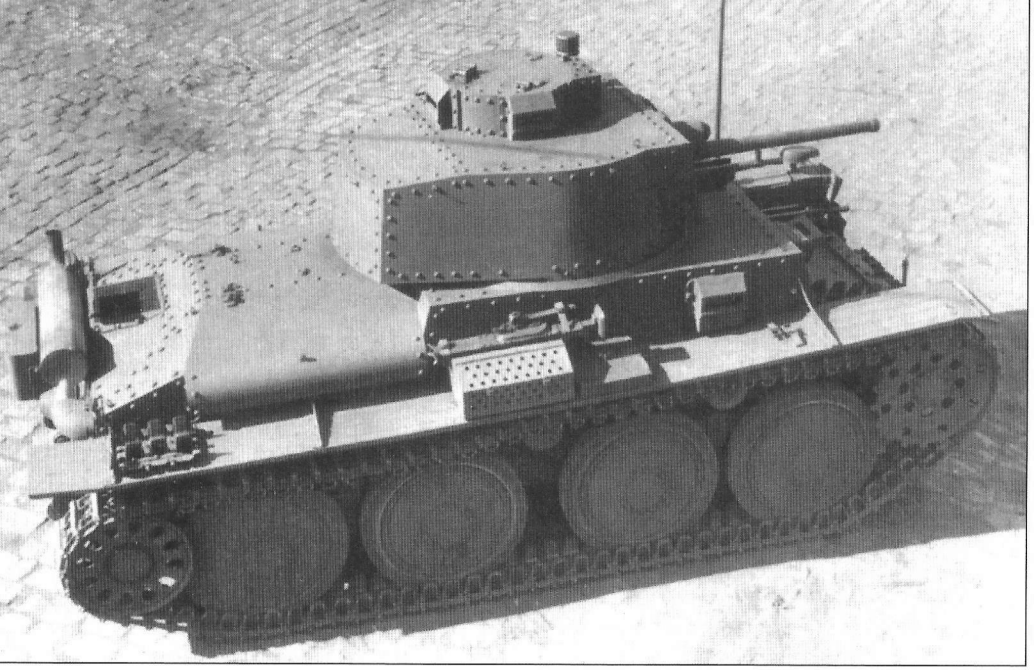
Pz.Kpfw.38(t) Ausf.C-D

This third series was manufactured from May to August 1940. Changes included a splash guard for the turret ring; the muffler was moved to a higher position on the rear plate to make room for a box with five electrically fired smoke cartridges, and the Czech radio aerial was replaced with a German one with a rubber shoe that allowed the aerial to bend out of the way of the gun barrel when the turret was rotated and, afterwards, to snap back. The front plate was beefed up to a thickness of 40mm.

The successful engagement in the Polish campaign in 1939 and very positive evaluation by the units using these tanks led the Waffenamt to order an additional 275 tanks in 1939 and a further 250 in 1940, The German authorities also ordered Böhmisch-Morawische Maschinenfabrik (BMM) – a new name for the ČKD, imposed by the Germans – to increase production from 30 to 50 tanks per month.

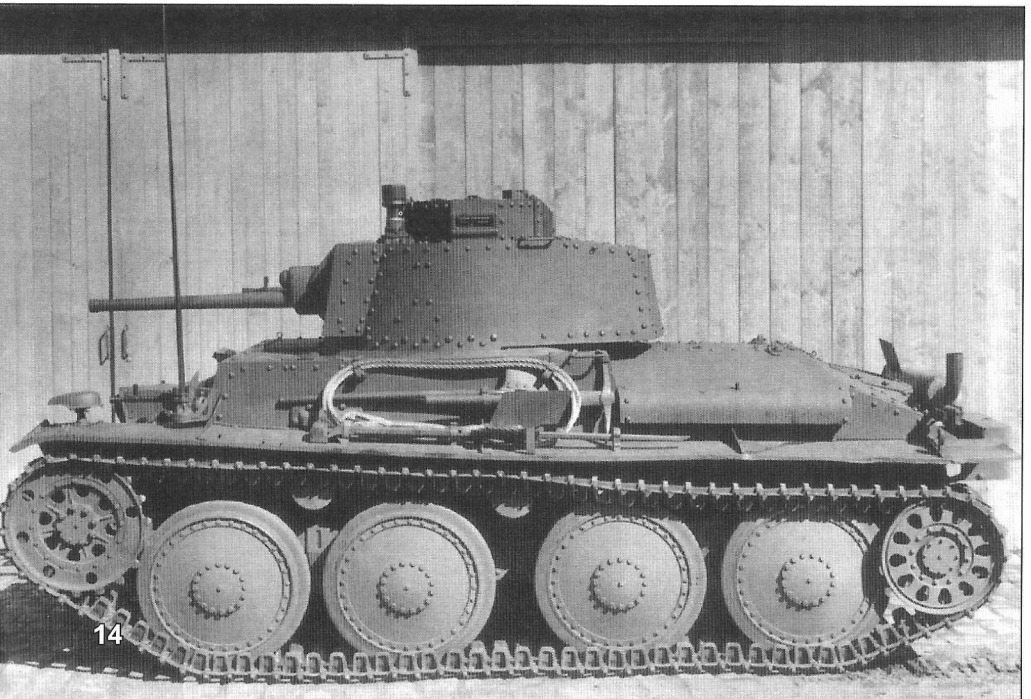
This Kpfw.38(t) is serving as a part of an armored train. The body of the tank is protected by the armor of the carrying flat-bed railway car. These tanks were used either as part of the train's artillery, or for counter-attacks after leaving the train.

A motorcycle combination of Kradschützen infantry accompanies a Pz.Kpfw.38(t) Ausf.A in France in the summer of 1940.



One of the visible results of the simplified manufacturing procedures on the Ausf.E-F vehicles was the decreased number of bolts on the engine's cover. The front plate is also straight and the position of the muffler has been raised.

A finished Ausf.E-F awaits delivery in this factory photograph. Once the vehicles reached their units, they were often modified by the addition of more items such as bins and jerry can holders. The vehicle is still in the original Feldgrau dark gray color overall.



Pz.Kpfw.38(t) Ausf.E-F

Tanks of Ausf.E were delivered between November 1940 and May 1941, when the production of Ausf.F got underway. Output of the Ausf.F then ended in October of the same year. Because the armor protection of the preceding series was shown to be insufficient during the Polish and French campaigns, the design bureau of BMM was ordered to double it in all vital areas.

This modification changed the appearance of the new tanks. The thickness of front plates of the hull was increased from 25mm to 50mm, and the plate in front of the driver was now straight. The same thickness was used on the front plate of the turret. Sides of the hull and turret were beefed up to 30mm. The connection of the plates to the frame was simplified, with a reduced number of rivets and bolts. Although the turret machine gun lost its protective ring, the hull machine gun retained its ring. The labor consuming armored covers for the driver's and radio operator's vision devices were replaced with stronger cast-armor cowls with observation slits. The attachment of the engine covers was also simplified, with the loss of five pairs of bolts on their sides. A new holder for seven reserve track links was mounted on the lower hull front plate, and two additional sets of five spare links were mounted on the sides of the front angled plate. These additions increased the reserve of these most strained components of the tank, and also increased the frontal protection.

At the same time, all this added protection also served to increase the weight of the tanks to 10,345kg, fully equipped. Since all this extra weight was situated in front, the front pair of running wheels spring cluster got an additional spring, making a total of 15 leaves. The engine remained the same as before, but a new type of Bosch electrical equipment was installed. In spite of the 10% increase in weight, the tank retained its performance.

Pz.Kpfw.38(t) Ausf.S

Concurrently with the Ausf.F series, Böhmisch-Morawische Maschinenfabrik delivered 90 TNH-Sv tanks, originally manufactured for the Swedish army. These vehicles were confiscated by the Germans in an almost finished state in July 1939, and received the designation Pz.Kpfw. 38(t) Ausf.S (S = Sweden). Because they were originally ordered without guns, the Wehrmacht had to order from Škoda an additional 90 guns. Additional machine guns were already available.

Because at that time Škoda was already manufacturing the gun mounts for the 50mm thick plates, these, as well as the front hull plates, had to be fitted to this series also. Their attachment with bolts and rivets remained the same as with series A-D. The vision cowls also remained the same, but were beefed up with additional plates on the inside. The armor of the hull remained the original 8mm to 15mm in thickness. All these additional changes and the waiting for the guns caused the tanks to be delivered to Wehrmacht representatives as late as the period from May to October 1941.

Pz.Kpfw.38(t) Ausf.G

Because the demand for the 38(t) tanks by the front units was high, in 1941 the Waffenamt placed two orders for Ausf.G and Ausf.H, each for 500 vehicles. The construction remained the same as for Ausf.E-F. Simplification of the production reduced the number of attaching bolts and rivets. The front plate in front of the driver, for example, was fastened by only six rivets, instead of the 13 used in Ausf.E-F. The NOTEK light was moved from the left fender to left edge of the front hull plate, where it was better protected against accidental damage.

The front plates of the Ausf.G were 50mm thick. The horizontal row of rivets was shortened from 12 to 11, and the screws holding the wheel axles and the gearbox were moved inside the vehicle. The plate in front of the driver was straight, and was secured by only 14 rivets (on Ausf.E-F), and later by only six (on Ausf.G).

The side visors of the driver and radio operator were replaced by cast covers with vision slits, as was the driver's front visor. The NOTEK lamp was moved to the edge of front plate.

The round cover of the machine gun ball mount in the turret's front was eliminated, and the number of bolts on both front and side plates of the mask was reduced.

The number of bolts on the engine covers was lowered from 14 (on Ausf.E-F) to four (on Ausf.G).

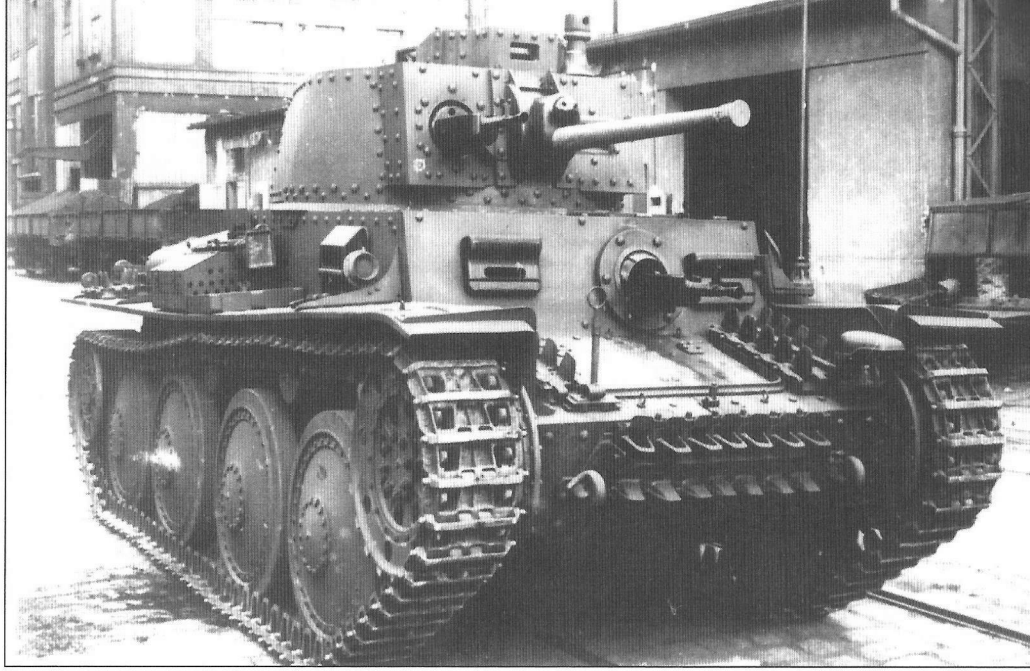
On the rear right fender was placed a box for the blow-torch, used to heat the engines in cold weather. The box with the five smoke cartridges was mounted on the rear plate below the exhaust muffler.

The production program was valid up to the beginning of 1942. It was planned that BMM would be delivering 65 tanks per month up to October, when the production would start tapering off and end on 1 April 1943.

PzKpfw 38(t) Modifications

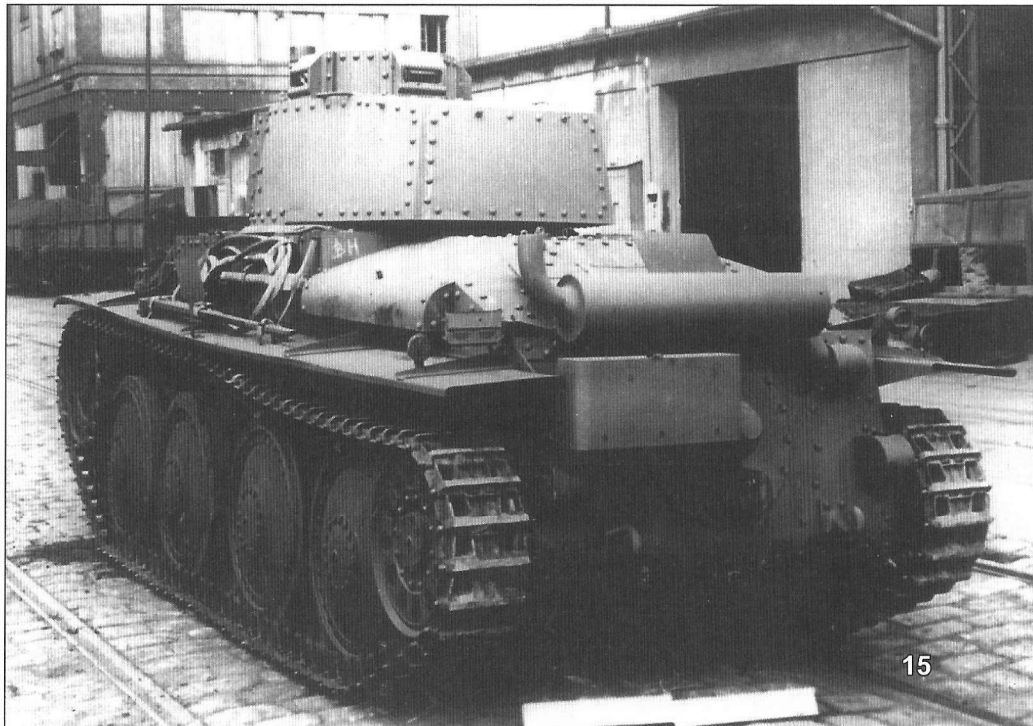
By the end of 1941, the Wehmacht was being rudely awakened by ever increasing numbers of the excellent Soviet T-34 tanks. Their 7.62 guns made them a very dangerous adversary, and their sloping armor made them practically immune to the German antitank cannons, with the exception of the 88s. The only efficient defense that could be mounted quickly was in the form of the tank-hunters – lightly armored vehicles with a highly efficient antitank gun. Luckily for them, in the summer of 1940 the Germans captured a great number of the excellent Soviet 7.62 antitank guns F-22 and their ammunition. At the same time the equally efficient German PaK 40 became available. In 1942 the Wehrmacht decided to mate these with the chassis of the Pz.Kpfw.38(t).

Thus, the production of the Ausf.G tanks was ended prematurely in April 1942, and the production of the MARDER III tank hunters began at the same time. Only 306 vehicles were built as Ausf.G tanks, the remaining 194 were finished as tank hunters. The already 184 manufactured complete turrets with armaments were also delivered and the Germans used them in fixed fortifications all over occupied Europe.



The final version of the Pz.Kpfw.38(t) is this Ausf.G. It features holders for replacement track links on the lower and middle front plates. The NOTEK light has been repositioned, and the anti-splash ring around the ball of the turret's machine gun has been removed.

The same tank is seen from the rear. These photographs were taken on 2 July 1942, which means that this vehicle was one of the last Ausf.G produced.



The surplus turrets of the Pz.Kpfw.38(t)s, modified as tank hunters, were used for fixed fortifications. A total of 357 turrets was used as armament of concrete bunkers: 75 in Norway, 20 in Denmark, 9 on the Western Atlantic shore, 25 in Italy, 150 on the Southwest of Europe and 78 on the Eastern front. This one was located in Corsica.

This Pz.Kpfw.38(t) Ausf B tank is accompanied by supporting Kradschützen (infantry on motorcycle combinations with one or two machine guns) in the French campaign in 1940. The tank carries an additional storage box on the left fender and is not equipped with the NOTEK lamp. It carries a bundle of wood in the rear.

Crews service three Pz.Kpfw.38(t)s. These tanks were of a very simple design and servicing them, which usually required less than 30 minutes a day, was much easier than it was for other tanks. The large German flag on the rear of the tank in the center of the photo alerted Luftwaffe pilots that these were German vehicles.

Modification

The Pz.Kpfw.38(t) tank served as a test-bed for several modifications on the original chassis. For example, one Ausf.G – chassis number 1481 – was tested in a tropicalized version in May 1942, as part of the new tank hunters on the 38 chassis that were slated for General Rommel's Afrika Korps and had to be modified for North Africa's hot and dusty environment.

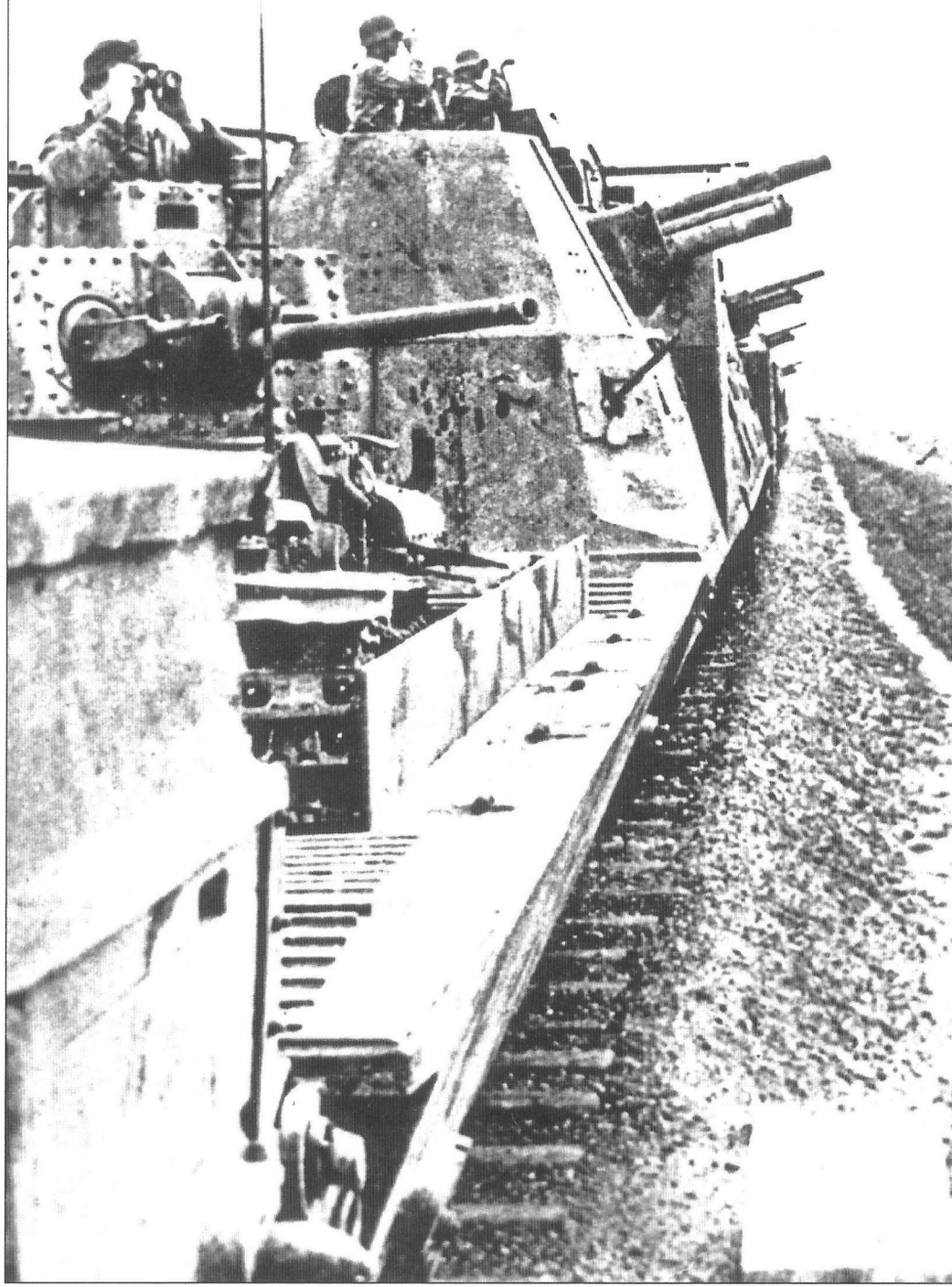
The Germans tried to transport Pz.Kpfw.38(t) tanks by air, using the six-engine Messerschmitt Me 323 Gigant transport plane. These tests were probably carried out between 1942 and 1943. The tank was also modified to be able to swim. In cooperation with the German Kassböhrer company in Ulm, BMM built a set of floats for this tank. The purchase order was placed in February 1941 and tests on the Vltava River in June 1942 proved the validity of the concept. One hundred pontoons were planned, but the adaptation was cancelled along with other projects for floating tanks. The prototype was shipped to the Kummersdorf testing center in November 1942.

Once the tanks were pulled from first-line duty, they were used for various auxiliary combat purposes. One such assignment was to armored trains. Each German armored train had two Pz.Kpfw.38(t)s on specially constructed flat cars in front and rear. The special railway cars were equipped with ramps that enabled the tanks either to fight from aboard the cars on the rails, or to roll out of the cars and support the counterattacks of the train infantry.

The Munitionsfahrzeug 38(t) was the standard Pz.Kpfw.38(t) tank with turret and armament removed. It supplied self-propelled artillery formations. Between January and March 1944, 102 of the tanks were thus modified – the ratio being two Munitionsfahrzeuge for six Grilles. Without their turret and armament, the vehicles weighed only eight tons.

Another use for the chassis was the Schulfahrerwanne, used for driver training. Turrets were also removed from these vehicles. Towards the end of the war, some training vehicles were equipped with wood-burning gas generators, in order to conserve gasoline.

A tank rolls off its flatbed train car to support an infantry counterattack.



A Pz.Kpfw.38(t) sits on a flatbed car as part of a German armored train. Usually, the trains carried a pair of the vehicles, one up front and one in the rear. Here the Pz.Kpfw.38(t) remains on the train and uses its gun to participate in side salvoes.

A Pz.Kpfw.38(t) tows a 200-liter drum on a trailer. On its rear fender, the tank also carries the incendiary shell ejectors used on flame-throwing tanks. Although such use of the Pz.Kpfw.38(t) was never documented, it is possible that some vehicles were thus modified. This photograph was taken near Minsk in June 1941.

The prototype of the floating tank comprises a large boat-like pontoon with an opening in the middle for the tank. A system of gears linked the two propellers in the rear with the tank's engine. Speed in water was expected to be 8km/hour. The tank was hermetically sealed and the engine air intake and exhaust were led to a chimney-like extension behind the turret.

The Pz.Kpfw.38(t) tanks that were retired from active service were also used as Munitionpanzers, or ammunition carriers. Their turrets were removed and the interior of the hull below the turret was used for storing ammunition for tanks, assault guns, tank hunters, and self-propelled artillery. Their great advantages when compared with ordinary trucks were their armor and their cross-country performance, which allowed them to keep pace with the armored formations.

Surplus Pz.Kpfw.38(t) vehicles were widely used for training drivers. To save precious gasoline, many of the vehicles were equipped with wood burning gas generators as seen here.

Pz.Kpfw.38(t) n.A

From the start of the war, the Wehrmacht sought a fast tracked armored vehicle for deep reconnaissance, as its standard light tanks were not suitable due to their low speed. The 6th Tank Development and Testing Center (Wa.Prüf-6) developed the specification and in July 1940 officially asked three companies to develop a fully tracked armored reconnaissance vehicle with a weight between 12 and 13 tons, and with a maximum speed of at least 50km/hour. The companies were the Skoda-Werke and BMM in the Protectorate, and MAN in the Reich. Skoda developed the T-15, MAN modified its Pz.Kpfw.II as a new design n.A. (neue Ausführung), and BMM naturally used the Pz.Kpfw.38(t) as a basis. The manufacturers were supposed to provide one soft iron and one armored vehicle riveted, and one soft iron and two armored welded.

The Czech-made vehicles had new A19 Skoda guns, an adaptation of the proven A7 gun for the semi-cylindrical mantlet. They carried only one machine gun in the turret, but had much more powerful engines.

In January 1942 the first prototypes were ready and were sent to the Tank Testing Center in Kummersdorf, where they were tested side-by-side in March and April. The properties of the three tanks were similar, but the BMM tank was judged to possess the highest operational reliability by far. The testing commission unanimously chose it as the winning candidate, but the commission's superiors decided differently and gave the first prize to MAN's vehicle. The tank probably was not as good as expected, because from the 800 ordered only 131 were built.

On the third prototype, BMM tested the air-cooled TATRA Diesel engine and larger running wheels with a diameter of 835mm, later used on the Jagdpanzer 38(t) HETZER. The tank closely resembled the original Pz.Kpfw.38(t), but for a slightly larger hull. The armor was 50mm thick on the gun mantlet, 30mm on front plates, 20mm on the sides and 25mm in the rear. Bottom and top plates were 8-10mm thick. Its ready weight increased to 11,500kg, but the specific pressure remained low – 0.6kg/cm2.

In the hull, the driver (for the first time in BMM design on the left) and the radio operator sat side by side. Both could look out through observation slits protected by armored glass blocks in German-type cowls. Both could exit through two-part hatches above their heads. The fully rotating turret was lower and, in place of the commander's cupola, its central part was raised across its full width. It had observation slits in front and rear (two each), and on each side. Its ceiling consisted of two hatches for the commander and the gunner. Completely covering the front of the turret was a semi-cylindrical mantlet, with an A19 gun in the center and a coaxial MG 34 machine gun on its right side.

The engine used was a gasoline V-8 PRAGA NR with an output of 264 h.p. at 2,300 r.p.m. It was connected via a Cardan shaft to five-speed PRAGA-Wilson gearbox, driving the front sprockets. Due to an advantageous output-to-weight ratio of 23 h.p./ton, changed gearing, and increased diameter of the running wheels, the vehicle reached an excellent maximum road speed of 64km/hour.

It was expected that the vehicle would use the air-cooled Tatra Diesel engine, which would give the tank higher speed and longer range.

As seen in this frontal view, the armament of the Pz.Kpfw.38(t) n.A. is a 3.7cm Škoda gun, but the turret coaxial machine gun was already the German MG 34.

The welded prototype of the Pz.Kpfw.38(t) n.A. has a new turret and larger running wheels than the standard type. The visors are already of the German type.

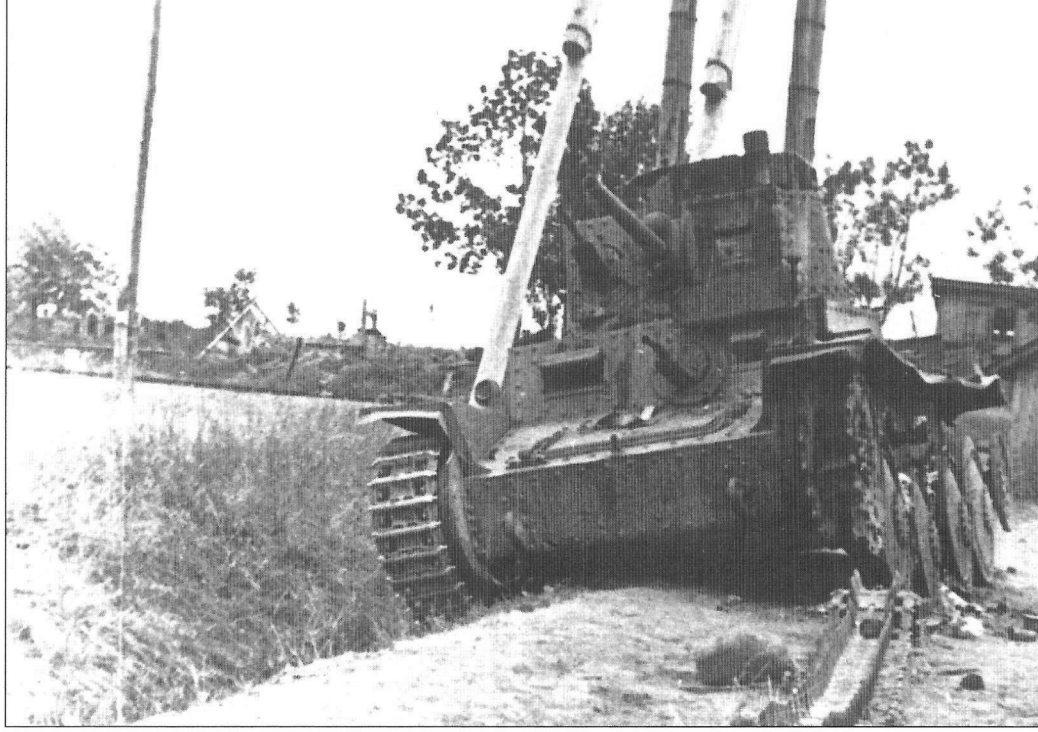
Technical Data of LT vz.38/Pz.Kpfw.38(t)

Manufacturer's Designation	TNH	TNHP/S	TNH-Sv	TNHn.A.
Army Designation		Pz.Kpfw.38(t)	Strvm/41	Pz.Kpfw.38(t)n.A.
Ready weight (kg)	8,200	10,354	10,500	11,800
Length (mm)	4,505	4,560	4,540	4,620
Width (mm)	2,080	2,150	2,140	2,260
Height (mm)	2,300	2,260	2,350	2,170
Ground clearance (mm)	400	400	400	400
Track spacing (mm)	1,780	1,780	Unknown	Unknown
Track contact length (mm)	2,920	2,920	Unknown	Unknown
Crew	3	4	4	4
Armor (mm)	15/12/10/8	8-50	50/25/15/8	50/30/20/10/8
Specific pressure (kg/cm2)	0.57	0.50	Unknown	0.60
Main gun	3.7cm	3.7cm	3.7cm	3.7cm
Type	Škoda A4 Beta	Škoda A4	Bofors	Škoda A19
Machine guns	2x7.92mm ZB 35	2x ZB 37	2x 8mm TKm39	1x 7.9mm MG 34
Submachine guns	Unknown	Unknown	1x 9mm MP40	1x 9mm Suomi
Ammunition carried	60/3,000	90/2,700/256	100/400/360	90/700
Engine manufacturer	PRAGA	PRAGA	Scania-Vabis	PRAGA
Engine type	TN-3	TNHP/S	1664/13	NR
Output (h.p.)	94	126	145	250
Maximum speed (km/hour)	35	42	46	64
Range (km)	150	210	Unknown	200
Fuel capacity (liters)	190	220	190	260
Obstacle crossing (cm)				
- step	80	80	80	80
- ditch	210	190	200	210
Wading (cm)	90	90	90	100

Wartime Use

When Germany attacked Poland on 1 September 1939, BMM had already finished 78 light tanks Pz.Kpfw.38(t) and 59 of them had been assigned to the 67th Panzer Abteilung (tank battalion) of the 3rd Leichte Division (Light Division), commanded by General Adolf Kintzen. The battalion had three companies of light tanks, each with four platoons. The first platoon of each company had five Pz.Kpfw.II Ausf.D, the other three had five Pz.Kpfw.38(t). The 3rd Leichte Division fought on the right wing of Armee Gruppe Süd (Army Group South) from the beginning of the campaign and finished it at Modlin. During the whole campaign it lost only seven Pz.Kpfw.38(t) vehicles to enemy action, and all were later repaired. The tank gave a good account of itself during fast marches on bad roads, and its defects were minimal. Its armor was impervious to infantry weapons, but hits by 3.7cm guns, and even 2cm guns from close range, were usually lethal.

In October 1939, the four Light Divisions were pulled back to their garrisons and were transformed to Panzer Divisions nos. 6 through 9. Their main attack forces became the Panzer Regimente (tank regiments) with three battalions each. According to mobilization tables, each tank regiment was supposed to have six Pz.Kpfw.38(t) vehicles and two Pz.Bef. 38(t)s in the communication section of its headquarters. The same number was planned for the headquarters of the three battalions. The two light tank companies of each battalion had 15 Pz.Kpfw.38(t)s plus one in reserve in the three platoons. In practice, none of the units attained full table status and at the beginning each campaign, the regiments were always slightly under strength.



Not all the Pz.Kpfw.38(t) vehicles enjoy good fortune. Of the 229 tanks that took part in the French campaign, 54 were damaged. Of those, however, only six had to be scrapped.

A motorcycle leads a column of Pz.Kpfw.38(t) vehicles in the USSR in Summer 1941.

A column of Pz.Kpfw.38(t)s Ausf.B of the 7th Panzer Division refuels in France.

Maintenance of a Pz.Kpfw.38(t), on which each running wheel has only one lubricating nipple, is fast and easy. It usually took no more than 30 minutes each day.

This Pz.Kpfw.38(t) of the 8th Panzer Division, taking part in the Balkans campaign in the summer of 1941, has extra stowage boxes on the left fender. The roads in the Balkans were mostly unpaved, and the dust posed a danger for the tank engines. The division's tanks pressed from Belgrade to Kotor on the Adriatic. After this 660km arduous trek, only the Pz.Kpfw.38(t) tanks remained operational. The German Pz.Kpfw.II and IV tanks gradually fell back with burned clutches, torn tracks, and broken springs.

German Units Equipped with Pz.Kpfw.38(t) Tanks

Fall Weiß (Poland 1939)	
3rd Leichte Division	
Panzer Abteilung 67	59 Pz.Kpfw.38(t)
Wesserübung Nord (Norway 1940)	
XXXI Armee Corps - 3 Panzer Züge	15 Pz.Kpfw.38(t)
Fall Gelb (France 1940)	
7th Panzer Division	
Panzer Regiment 25	106 Pz.Kpfw.38(t)
8th Panzer Division	
Panzer Regiment 10	
Panzer Abteilung 67	116 Pz.Kpfw.38(t), 10 Pz.Bef.W.38(t)
Unternehmen 25 (Yugoslavia, Greece 1941)	
8th Panzer Division	
Panzer Regiment 10	118 Pz.Kpfw.38(t), 7 Pz.Bef.W.38(t)
Unternehmen Barbarossa (Soviet Union 1941)	
6th Panzer Division	
Panzer Abteilung 65	149 Pz.Kpfw.38(t), 11 Pz.Bef.W.38(t)
7th Panzer Division	
Panzer Regiment 25	167 Pz.Kpfw.38(t), 7 Pz.Bef.W.38(t)
8th Panzer Division	
Panzer Regiment 10	118 Pz.Kpfw.38(t), & P.Bef.W.38(t)
12th Panzer Division	
Panzer Regiment 29	107 Pz.Kpfw.38(t), 10 Pz.Bef.W.38(t)
19th Panzer Division	
Panzer Regiment 27	118 Pz.Kpfw.38(t), 7 Pz.Bef.W.38(t)
20th Panzer Division	
Panzer Regiment 21	113 Pz.Kpfw.38(t), 10 Pz.Bef.W.38(t)

The Panzer Division, aside from the Pz.Kpfw.38(t)s, had also Pz.Kpfw.II and Pz.Kpfw. IV. tanks.

A Pz.Kpfw.38(t) Aus.E takes part in the first phase of operation Barbarossa, the attack on Soviet Union. Six Panzer Divisions mustered a total of 834 of these tanks, almost a third of the Wehrmacht's tank strength.

A column of Pz.Kpfw.38(t)s of the 8th Panzer Division, advances toward Leningrad in summer of 1941. These Ausf.Bs carry their smoke cartridges in the rear over the muffler, and carry a lot of extra equipment for the long marches.

This column of Pz.Kpfw.38(t)s Ausf.B of the 7th Panzer Division is southwest of Vyazma in summer of 1941. The tanks again carry a lot of extra equipment and supplies. The last tank carries all the crew's helmets on the turret, and an un-ditching beam on the left fender.

A damaged Pz.Kpfw.38(t) Ausf.E and accompanying infantry are seen during the Russian campaign in the summer of 1941. In the rear is a destroyed Soviet BT 7 tank. The BT 7 with its 4.5cm gun was equal to the Pz.Kpfw.38(t), but the bigger, better armored T-34 with the 7.62 gun was a deadly enemy.

Pz.Kpfw.38(t)s attack the French in packs like wolves and by concentrating their fire liquidate individual defensive positions.

The first snow is already on the ground and worse is coming for this Pz.bef.38(t) Ausf C with the large frame aerial seen in the fall of 1941.

A column of Pz.Kpfw.38(t) command tanks belonging to the 8th Panzer Division surrenders to Soviet troops. They do not carry the hull machine guns.

Some Pz.Kpfw.38(t) commanders were highly decorated. Oblt. Orloff, who fought in both France and Russia, is seen here in 1942 wearing his Knight's Cross.

Operational (A), Delivered (B), and Lost (C) Tanks in Wehrmacht Service

Month	January	February	March	April	May	June	July	August	September	October	November	December	TOTAL
1939 A	N/A	N/A	N/A	N/A	N/A	9	21	60	78	103	141	144	
1939 B	N/A	N/A	N/A	N/A	N/A	21	39	18	31	30	11	N/A	150
1939 C	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6	N/A	N/A	N/A	6
1940 A	144	154	178	209	238	233	253	277	320	357	401	432	
1940 B	10	24	34	30	30	30	38	24	35	44	27	44	370
1940 C	N/A	N/A	N/A	N/A	43	11	N/A	N/A	N/A	N/A	N/A	N/A	54
1941 A	476	520	570	636	686	754	763	661	543	547	528	434	
1941 B	44	50	53	49	68	57	65	64	76	53	50	49	678
1941 C	N/A	N/A	N/A	N/A	N/A	33	175	173	62	84	144	102	773
1942 A	381	424	491	522	521	454	479	479	436	375	334	309	
1942 B	59	62	28	1	21	26	N/A	N/A	N/A	N/A	N/A	N/A	198
1942 C	31	8	7	11	6	4	5	20	24	37	25	18	196
1943 A	287	252	242	161	186	197	204	212	201	255	260	249	
1943 B	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
1943 C	30	12	30	4	2	N/A	N/A	1	1	5	10	96	193
1944 A	227	227	227	227	227	229	232	229	140	138	136	Unknown	

1944 B no new production
1944 C no losses
1945 no verified official data available

Pz.Kpfw.38(t) tanks were also provided for allies of Germany. The tanks, new or refurbished, were shipped from the Vienna Arsenal.

A = operational tanks on hand on the 1st day of each month.
B = number of tanks shipped by BMM. It agrees with the number of tanks manufactured (1,396), but does not agree with the number of tanks accepted each month by the Wehrmacht. BMM data are used, OKH data do not agree with the facts.
C = tank losses for the given month. Included are both machines written off and machines later repaired or rebuilt.

Pz.Kpfw.38 Tanks Supplied to Germany's Allies

Country	Date Transferred	No. of Vehicles	Official Designation
Hungary	11.04.1941	15	T-38 könnyű harckocsi
Hungary	01.15.1942	12	T-38 könnyű harckocsi
Hungary	01.27.1942	31	T-38 könnyű harckocsi
Hungary	02.11.1942	25	T-38 könnyű harckocsi
Hungary	03.04.1942	24	T-38 könnyű harckocsi
Hungary	11.11.1942	4	T-38 könnyű harckocsi
TOTAL		111	

Country	Date Transferred	No. of Vehicles	Official Designation
Romania	03.17.1943	50	T-38
Bulgaria	05.20.1943	10	JleK TaHK Praga
Slovakia	08.03.1943	20	LT-38
	12.15.1943	12	LT-38
	07.08.1944	5	LT-38
TOTAL		37	

When Germany's first ally, the Slovak State, participated in the rape of Poland in 1939, it had no LT-38 tanks. By July 1941, however, Slovakia's Fast Division was already using its eight tanks of this type against the Red Army.

The LT-38 tanks did fight in the Uprising, which began in August 1944, but so late in the war they could not compete with Pz.Kpfw.IVs and Jagdpanzer 38(t)s, and the last of them were abandoned when the Uprising was defeated.

In October 1942, a company of the LT-38 tanks was sent all the way to the Caucasus to support the Fast Division, which was fighting there. During the retreat at the beginning of 1943, the company lost all but one of its tanks.

In order to supply its newly formed 1st Armored Division, Hungary bought from Germany 105 Pz.Kpfw.38(t) Ausf.G tanks and six Pz.Bef.Wg.38(t) vehicles between November 1941 and April 1942. The first Armored Division was a part of the Hungarian 2nd Army.

Use by Germany's Allies

The Hungarians used the tanks to equip their 1st Armored Division, which as part of the 2nd Army, fought on the Don' during the battle of Stalingrad in the Soviet Union. In the course of the Soviet offensive, which began on 12 January 1943, the 1st Armored division was practically annihilated (190 of its tanks were destroyed; only six tanks returned home) and was disbanded after its remnants returned to Hungary. Hungary did not replace these tanks, as in 1943 the country already had tanks of its own design, and in addition Germany was supplying the Hungarians with Pz.IVs.

The Romanian army also had a 1st Armored Division, which was originally equipped with Škoda R-2 tanks (a version of the Czech LT vz.35) The unit fought with these tanks at the siege of Odessa, and after its fall in October 1941, was transferred to Romanian 3rd Army at the Stalingrad front, where it fared similarly to the Hungarians. The Soviet offensive started on 19 November 1942. The division fought bravely, but by 2 December it had only three operational tanks and 944 men. After its return to Romania, it was re-equipped with the Pz.Kpfw.38(t)s and Pz.Kpfw.IVs, and fought the last battles for Romania in 1944.

The Bulgarian Pz.Kpfw.38(t) vehicles were incorporated into the Tank Brigade of the 1st Bulgarian army, which participated in the conquest of Hungary and Austria, after changing sides in 9 September 1944. Right after the war, Bulgaria asked Škoda for spare parts for its Pz.Kpfw.38(t), and used them up to the 1950s, when its army switched to Soviet equipment.

The Hungarians were not prepared for the cruel winter, which started already in November 1942. During the large Soviet offensive that began 12 January 1943, the Hungarian 2nd Army was practically annihilated and lost nearly all of its armored vehicles.

After rearming, the 1st Romanian Tank Division, is equipped with Pz.Kpfw.IVs and 50 Pz.Kpfw.38(t) vehicles, like these seen near Poltava in 1943.

The remaining Pz.Kpfw.38(t) tanks of the Romanian Army are evacuated from the Crimea in 1944.

The Bulgarian Army bought 10 Pz.Kpfw.38(t) tanks of various Ausführungen in May 1943. In the end, after the country switched sides in 1944, Bulgaria used the tanks against the Wehrmacht. They fought well in the mountainous terrain and, in the ranks of the Tank Brigade of the 1st Bulgarian Army, took part with the Red Army in the liberation of Austria in 1945. The Bulgarian PRAGA tanks participated in a parade in Sofia after returning from the fighting in 1944. The hand-painted white inscription on the front plate shows they belonged to the 9th company.

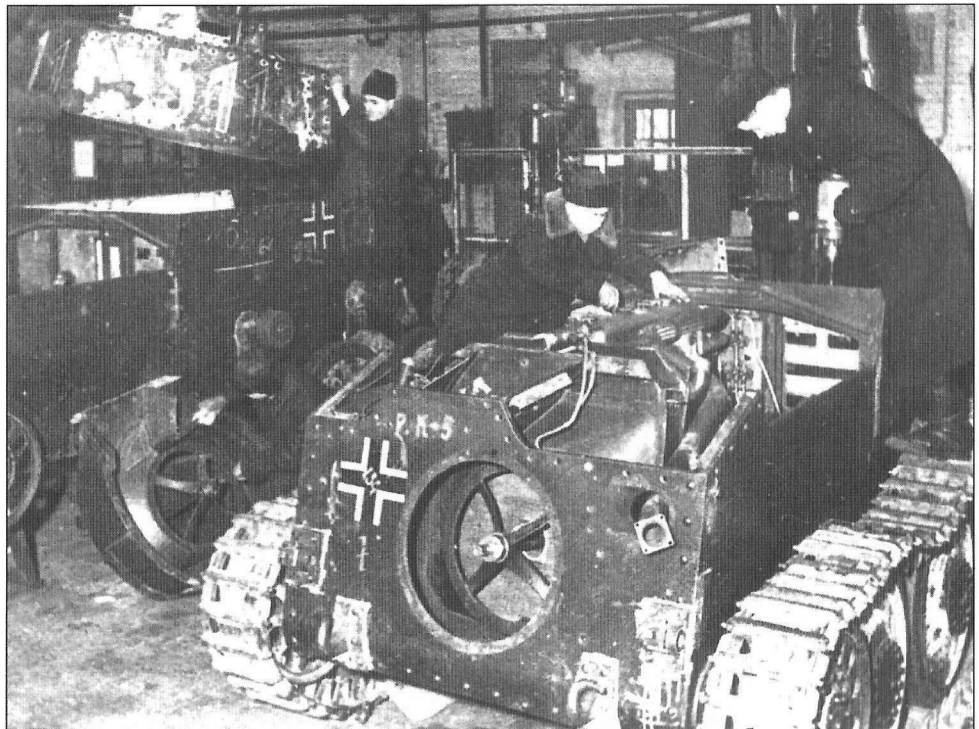
Use by the Allies

The French and British armies met these tanks on the points of German tank columns in 1940. Although their outstanding tactical and technical properties were known to them, their tank experts were reluctant to recognize the LT vz.38 as the best light tank. How great must have been the humiliation of these "experts" when their tanks were chased all over the French countryside by those underrated tanks. It is quite improbable that the Allies managed to capture one of these tanks during their retreats in May and June 1940.

Tank Pz.Kpfw.38(t) Ausf.E/F with a call number 543 on its turret, was tested in England according to available photographs. It was probably captured following the Allied invasion of France in summer 1944, or perhaps even before that, during the Italian campaign in 1943. In any case, at the time of its capture, its importance was greatly diminished, for at that stage of the war the light tank's role was severely limited.

On the Eastern front, the Pz.Kpfw.38(t) tanks were used in great numbers by the Wehrmacht up to late 1943, and quite a few were captured by the Red Army in running condition. The Russians clearly used them in their tank units, as verified by a photograph of a column of these tanks, loaded on flatbed railway cars, and carrying large red stars on their front and turret sides. The precise numbers of these tanks captured and used by the Red Army are not known.

Soviet mechanics repair two Pz.Kpfw.38(t)s that originally belonged to the 19th Panzer Division. The rear armor plates are removed, allowing a clear view of the engine compartment.



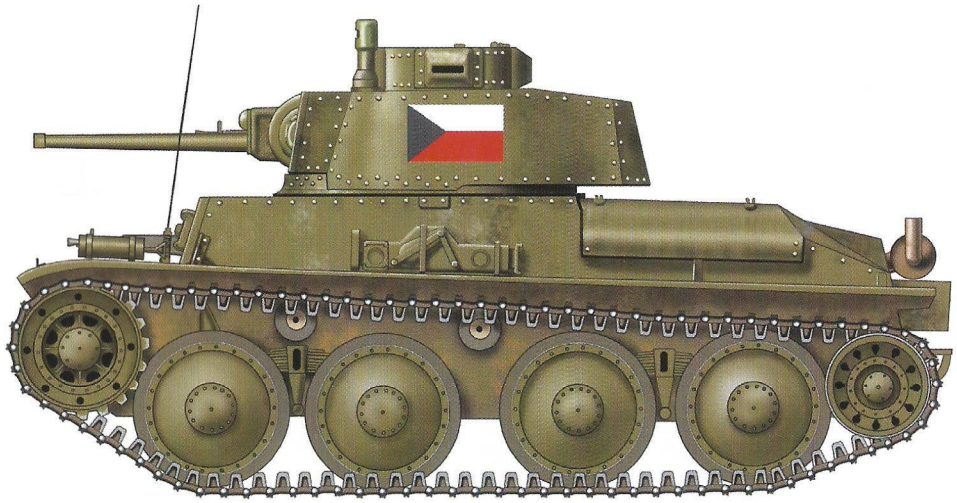
LT vz.38 in the Czechoslovak Army

The Czechoslovak Army finally got its LT vz.38 tanks in May 1945. Although the production of this tank in the Prague plant of the BMM terminated three years earlier, the company was still repairing these vehicles. Some tanks were with the tank training center in Milovice, and the army obtained scores of them tanks from the German units after their surrender, and also from the defunct Slovak Army.

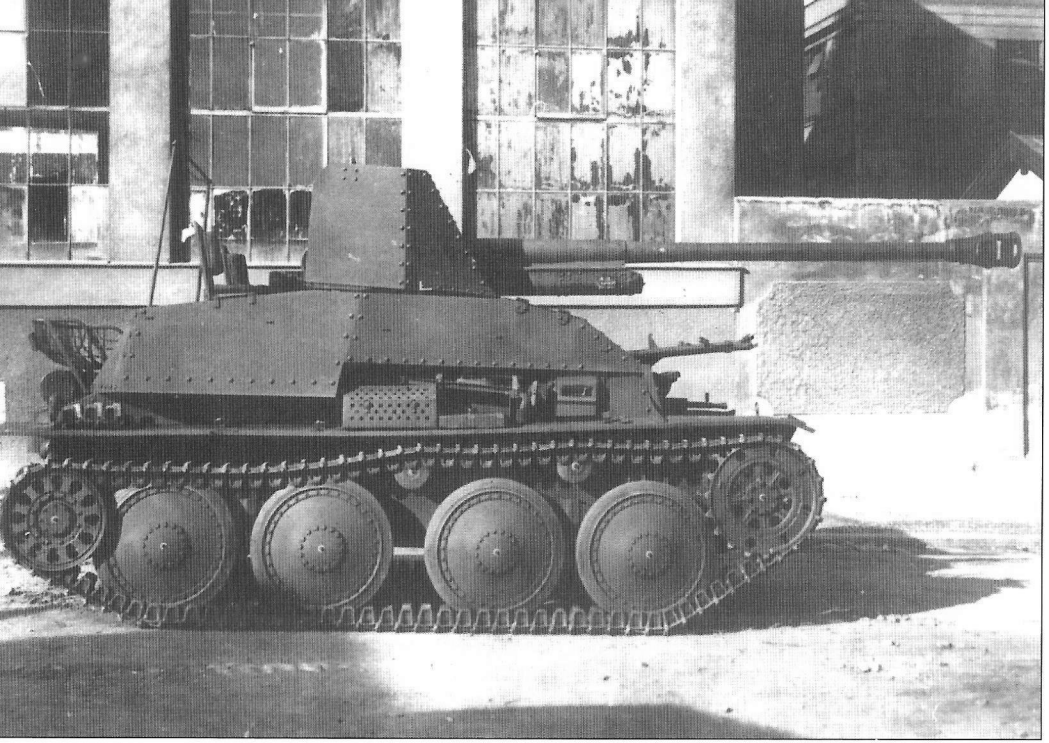
The new Czechoslovak tank units were formed in the summer of 1945. The LT vz.38 tanks, together with the Jagdpanzer 38(t) Hetzers, represented the only available equipment for the 1st Tank Battalion, based in Prague. By the end of August, the army had collected 22 of these vehicles, but only 13 were in running condition. More tanks were collected in Slovakia, so that at the end of summer 1945, the army had 31 LT 38/37 tanks (new designation, where the 37 denoted the caliber of the gun). The army had medium tanks (Cromwells and T-34s) as their battle force, and the M5 Stuarts and the LT 38/37s were used mainly for driver training. They were usable in combat, but their light armor and small caliber guns meant that they were suitable mostly for reconnaissance and police actions. The LT 38/37s were actually used in action in 1947, when they braved difficult mountainous terrain to support infantry units liquidating the Ukrainian nationalist "Bandera" bands.

Two tanks of this type have been preserved in the former Czechoslovakia. One of them, probably from the roster of the Slovak Army, was put on display shortly after the war as a monument of the Slovak National Uprising in Banská Bystrica in Slovakia, where it remains today as a museum exhibit. The second LT 38/37 was transferred to the Military Historical Institute in 1959. Today, after a complete restoration, it is exhibited in the Military Technical Museum in Lešany close to Prague. It is probably the only running example of this type of vehicle in the whole world.

This Pz.Kpfw.38(t) with an unusual camouflage scheme is parked in the main square of Polička in the Protectorate at the beginning of May 1945. After 1942, the Pz.Kpfw.38(t) tanks were pulled back from the front units and were assigned to policing units behind the lines. The Wehrmacht had over 200 of these tanks on its roster in May 1945. On the rear fender is a box containing a welding torch, used for start the engine in cold weather.



The Pz.Kpfw.38(t) is finally in Czechoslovak Army's service. The German insignia were quickly replaced by large Czechoslovak flags on the side of the turret. The Czechoslovak Army did not return to the pre-war three-tone camouflage, but camouflaged its vehicles in overall khaki. The cylindrical object on the front fender is a fire extinguisher.



The side view of the Panzerjäger 38(t) Sd.Kfz.139 shows the high silhouette of the vehicle, the massive gun and the fairly poor protection of the crew. The support used to secure the gun during transport is lowered. On the rear of the vehicle the seats of the gun crew are shown in the up position. The armor plate in front of the driver was taken over from the Pz.Kpfw.38(t) with its visors and the hull machine gun,

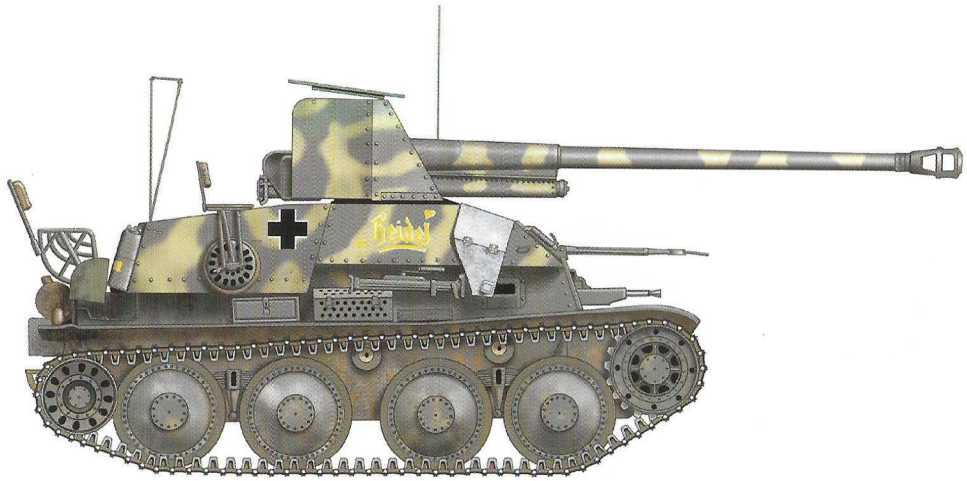
Sd.Kfz.139s are loaded for transport to the front. Most of the vehicles were shipped to the Eastern front, where the need for effective antitank weapons was the greatest.

Panzerjäger 38(t) für 7.62cm Pak 36(r)

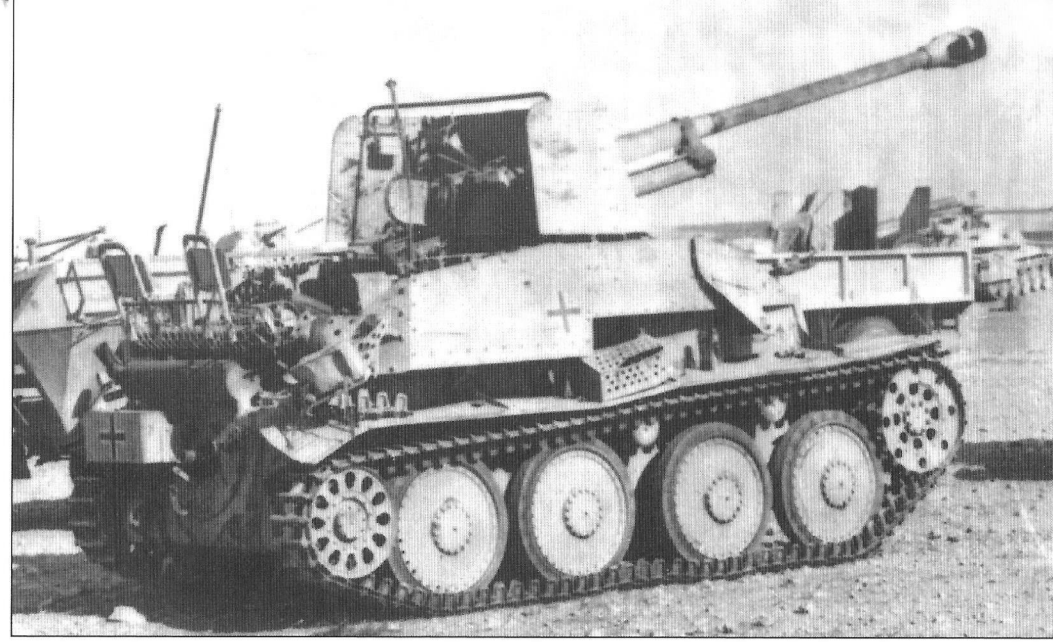
The modification of the Pz.Kpfw.38(t) tank to the tank hunter Sd.Kfz. 139 was a simple conversion. The turret and the top plate of the fighting compartment were removed and a captured Russian 7.62cm antitank gun was mounted on a cross, whose members were welded to the hull sides and the front and rear plates. A new 15mm-thick plate was welded to the top of the front plate to heighten the fighting compartment. At the level of the original top plate were welded 10mm-thick plates to widen the width of the hull. The slanted engine side covers were replaced with horizontal ones. A six-piece armored shield 10mm thick, which covered the breach and the traversing mechanism of the gun, was fastened to the gun's lafette, and moved with the gun through its traverse of 42°. The superstructure was open from above and from the sides and provided only a minimum protection to the gun's crew. The gun was equipped with a straight sight. It was re-chambered for German ammunition that gave it a muzzle velocity of 960m/sec. It fired a 4.15kg shell that could penetrate 94mm armor at 1,000 meters. Thirty rounds were carried in the former fighting compartment. The open rear part of the vehicle was protected against rain by a folding canvas cover, which was fastened to the gun cover up front, and to two metal supports in the rear corners of the superstructure.

Though poorly protected, this modification combined a proven chassis with an effective gun and provided antitank capabilities for the hard-pressed infantry and Panzer Grenadiere units. From April to October 1942, 344 of the Sd.Kfz. 139 vehicles were built, 194 on the Ausf.G chassis, the rest on Ausf.H, which already had the new PRAGA AC engine with an output of 150 h.p. at 2,600 r.p.m. By installing the stronger engine, the mobility of the vehicles improved by 20%, and the maximum speed rose from 42km/hour to 49.5km/hour.

A PzJäg 38(t) Sd.Kfz.139 in two-tone camouflage of yellow spots over basic gray serves on the Russian front in the summer of 1943. The driver's hatch is open.



In 1942, the Afrikakorps was sent 33 of the tropicalized version Sd.Kfz.139, three of which are seen here. These vehicles display the high silhouette that was a disadvantage in the open desert, where concealment was particularly hard to attain.



This Sd.Kfz.139, captured in Libya in 1942 in Libya is evaluated by the British School of Tank Technology (Report STT 2469). The driver's hatch is open and the backrests of the gun crew's seats are in the rear storage.

The height of the vehicle is clearly evident in this image from Russia, where the driver has his hatch open for better ventilation in the hot summer. Seated outside, overlooking some extra track links fixed to the front plate, is the radio operator. The gun crew is standing on both vehicles, an indication that they are moving in safe rear areas.

On this well camouflaged MARDER in southern Russia in 1942, the seats are folded, the muzzle cover is off, and the gunner is wearing a helmet – clear indications that the vehicle is ready for combat. Good concealment was essential for the lightly armored tank hunters, whose task was to hit hard and get out quickly.

These two MARDERs of the 19th Panzer Division are ready for combat on the Eastern front in 1942. The swastika flag for aerial recognition was usually placed on the rear of the vehicle, since on the front its bright red color was visible to the enemy.

Their crews not yet wearing helmets, a couple of Panzerjäger Sd.Kfz.139 vehicles prepare for action. These vehicles usually engaged the enemy in pairs or even whole platoons, so that they could combine their fire for greater effect.

The crews are sitting outside and the guns are secured on these Sd.Kfz.139s, seen on the move some distance from the front. The vehicles are towing small trailers with extra gasoline.

Panzerjäger 38(t) fűr 7.5cm Pak 40/3 - Sd.Kfz.138

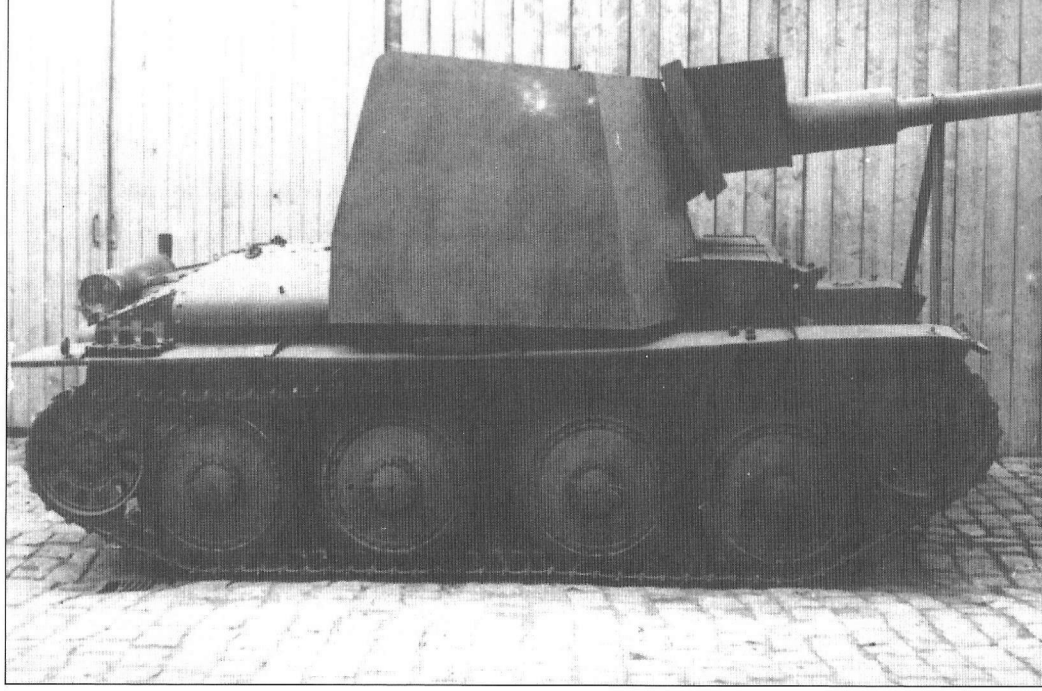
The next tank hunter on the Pz.Kpfw.38(t) chassis used the German 7.5cm PaK 40. Its design was much improved from the Sd.Kfz. 139. The front of the fighting compartment was retained, but because the gun was moved forward, the driver and the radio operator had to access their positions by crawling through narrow openings on the bottom of the fighting compartment, and in case of a hit had only a small chance of survival. Because the gun was positioned further forward, the gunner and the loader could service it standing on the floor of the fighting compartment. This was a great advantage as compared with Sd.Kfz.139, as the gun crew could service the gun standing up, and their protection against infantry weapons and splinters was greatly improved.

The gun was provided with an armored superstructure that provided much better protection than the one on the Sd.Kfz.139. Made from perforated plates, a shallow tub for spent cartridges was fixed above the engine covers, which were retained on the vehicle. This arrangement also increased the work space of the crew. The crew compartment was again protected from rain by a removable canvas cover.

The lafette of the gun rested on a T-shaped support, attached to the firewall and to the sides of the fighting compartment. It was provided with a fixed curved shield, which moved with the gun through its 56° traverse, and on the sides it slid along the edges of the fixed superstructure. It was also provided with a traveling lock. The gun had a muzzle velocity of 930 m/sec and could penetrate 90mm of armor at 1,000 meters. As on the Sd.Kfz. 139, the tank hunter retained the frontal machine gun, and was fitted with four periscopes on the front and side of the superstructure. The vehicle carried 38 rounds for the gun and 600 for the front machine gun, and its maximum speed was 30 miles/hour.

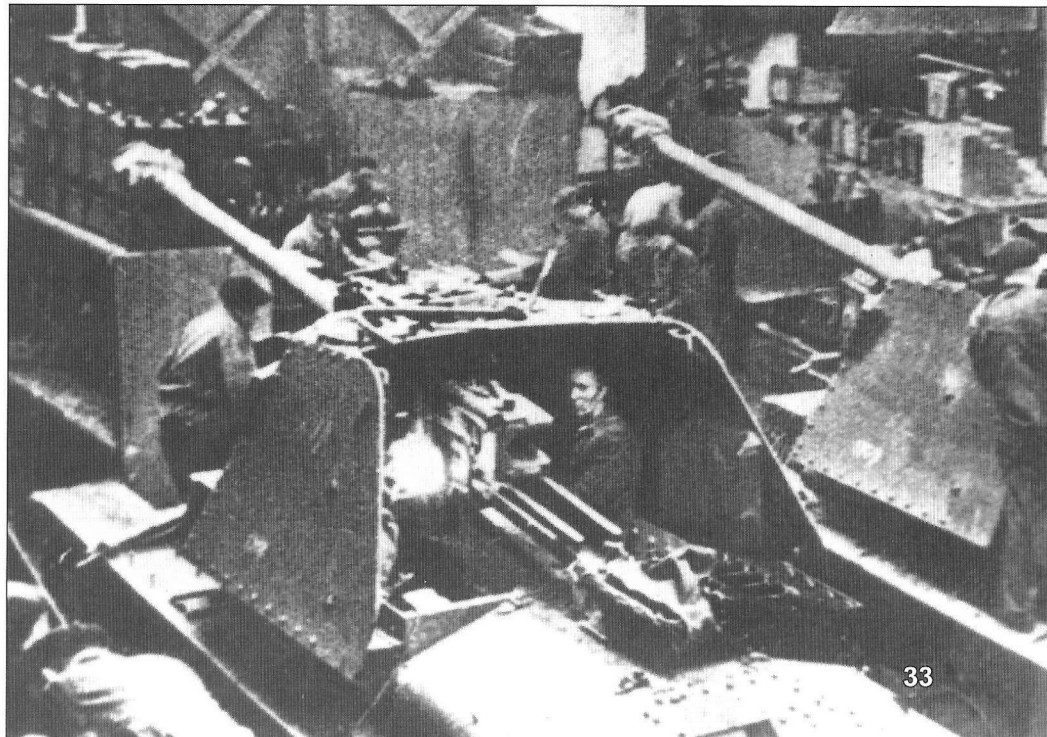
Although the full-scale production of the Sd.Kfz.138 was ready in the spring of 1942, the first vehicles left the factory as late as November 1942, after the production of the Sd.Kfz.139 was terminated. By the end of 1942, BMM delivered 110 Sd.Kfz.138 to the Vienna Arsenal. Production was maintained up to May 1943, when the last six vehicles of this type were delivered. A total of 260 Sd.Kfz.138s were produced as part of the 8th series Ausf.H, ordered in 1941. The final deliveries were from Ausf.K series, nine in April 1943 and six in May 1943. In all, 728 of the Sd.Kfz.138 were manufactured new.

As with the Sd.Kfz.139, the Sd.Kfz.138s were produced as brand new vehicles, and also modified on the repair chassis of the old tanks. BMM provided the superstructures and the guns, but because it was fully occupied manufacturing new vehicles, the modifications were carried out in the former automobile repair shop of the defunct Czechoslovak Army Repair Facility in Přelouč. A total of 336 vehicles were modified. Germany provided 18 of these vehicles to the army of the Slovak State in 1944. The Slovaks used them against the Germans during the Uprising in August 1944. These vehicles represented the only efficient antitank weapons of the insurgents, but due to their small number and poor tactics used, they did not last long.



A BMM factory photograph shows the prototype of a Panzerjäger mounting the 7.5cm StuK K 40 L/45. The 7.5cm PaK 40 L/48 was adopted on production vehicles.

Getting their start on the production line at BMM in Prague, all the production Sd.Kfz.138s are built on Ausf.H chassis but are powered by a stronger engine.



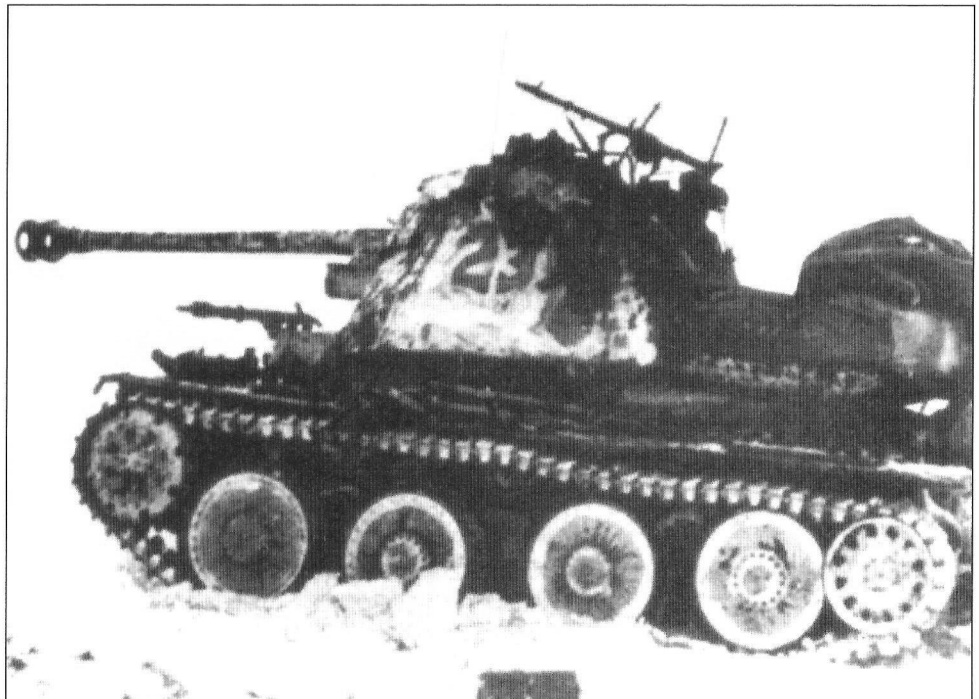
A vehicle belonging to the 1st SS Panzer Division Leibstandarte Adolf Hitler takes part in the Battle of Khar'kov in the spring of 1943.

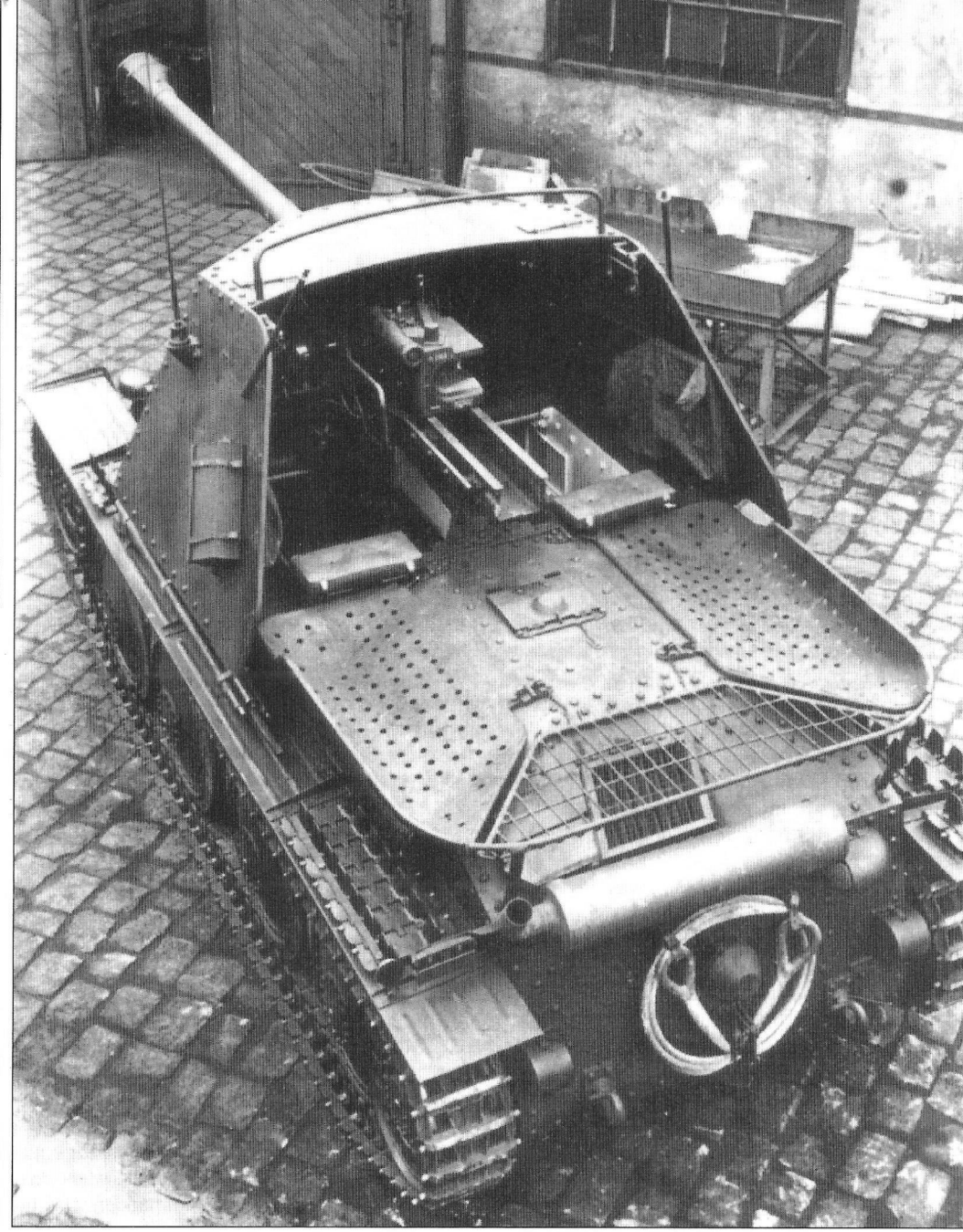
A unit of Sd.Kfz.138 Panzerjägers crosses a bridge in Russia in the summer of 1943. A folded canvas cover can be seen on the superstructure of the first vehicle.

Two Sd.Kfz.138s sit on a square somewhere in France in 1944. The front vehicle is already carrying extra track links on its front plates and has been fitted with an antiaircraft machine gun.

The disadvantage of a light armor is clearly seen on this Sd.Kfz.138 of the Slovak Army. The Slovaks bought 18 of the vehicles in 1944, and used some of them, including this one, during the Uprising. It was usually fatal for such a lightly armored tank hunter to cross a wide open field.

The Sd.Kfz.138s were equipped with antiaircraft machine guns that could be attached to the canvas roof support tube, as has been done on this vehicle with an MG 42.





Unlike the Sd.Kfz.139, the Sd.Kfz.138 has its ammunition stored on the sides, leaving the area below the gun free for the crew to service while standing up, as seen in this shot of a fighting compartment. The engine covers were not modified, but had on them a perforated platform, whose wings were foldable with the engine's covers. The protection of the gun crew was also much improved, even from overhead.

The front armor of the superstructure is clearly visible on this Sd.Kfz.138, on display at the Bundeswehr Panzer Troop School in Munster. The sliding armor plate could be used to close the window for the spotting scope. The vehicle, which is probably painted in Dunkelgelb RAL 7028, carries the sign of the 1st Panzer Division. It is missing its Notek light and the front machine gun, but otherwise is in excellent condition. Contrary to the information on the sign posted in front of it, the vehicle's weight was 10.8 tons, not 11.6.

Panzerjäger 38(t) fűr 7.5cm Pak 40/3 - Sd.Kfz.138M

The last of the tank hunters was a basically changed vehicle. From the beginning of 1943, BMM cooperated with Alkett on improving and simplifying the vehicles based on the Pz.Kpfw.38(t) chassis. Such cooperation was necessary in order to be able to build 100 - 150 per month, planned for the second half of 1943, because the original design's production rate had reached its limits. The target was achieved by switching the positions of the engine and the fighting compartment.

The crew compartment was moved to the back of the vehicle, and was sunk into the hull. This allowed the crew to serve the gun standing up, and still be protected by the superstructure. The dimensions of the hull with its superstructure remained basically the same, but it was much better balanced spatially. The driver sat on the right, separated by a light partition from the engine's compartment in the middle. Because the two front plates were replaced by one large plate 15mm thick at an angle of 67°, it was necessary to provide a cover for the driver's head. The cast hood was 15mm thick, had a vision slit in the front, and a two-part circular padded hatch, opening to the sides.

The engine with its accessories was moved into the center of the hull into the area originally below the turret. An opening on the right side of the hull above the tracks, that was protected by grating supplied cooling air. The hot air exhaust was located on the right side behind the driver's hood, and was protected by a three-piece armored grate. The exhaust pipe was channelled through the air intake grating and ran along the side of the hull to the rear plate, where it ended in a muffler.

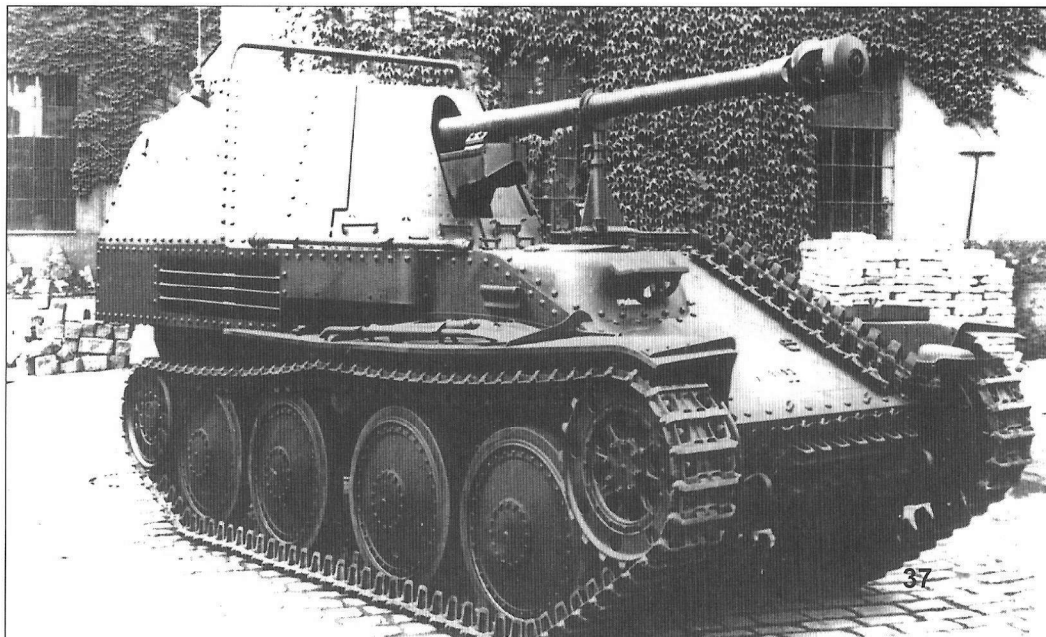
The superstructure, slightly longer in the rear, was of a simpler shape and had fewer armored plates than earlier versions. The plates were 8, 10, 12, and 15mm thick. The support for the 7.5cm PaK 40/3 was placed above the radiator. Thus, the weapon was moved back, which favorably affected the vehicle's balance and stability. Moving the gun back also prevented its long barrel from extending over the front of the vehicle, thereby improving the vehicle's maneuverability, especially in wooded or built-up areas.

The commander, gunner, and loader had plenty of room in the lengthened fighting compartment in the rear. They were protected by armor on all sides and only the top remained open. They could observe outside by using four folding periscopes, two up front and one on each side.

The rectangular plate above the muffler in the rear was hinged and could be lowered to horizontal position to ease crew's access and for supplying the vehicle with ammunition. The gun was fixed during movement with the usual support up front and a stirrup in the rear. The vehicle carried 27 rounds for the main gun and 1,500 rounds for the free machine gun. The fighting compartment had the usual tent-like cover against inclement weather. The running gear was simplified by removing one roller. The construction used more welding, although many bolted or riveted joints were retained.

The angled front plate of the MARDER III, Sd.Kfz.138 Ausf.M, is evident in this factory photo. Initially only 15mm thick, the plate's thickness was later increased to 20mm. The driver sat under a cast cover with a front visor and two-part hatch. The armor of the spacious rear fighting compartment protected the standing crewmen from light arms and splinters from all around. The engine was in the middle, next to the driver.

The air cooling intake is under the grille on the side of the superstructure of the final version of the MARDER III. The gun's armored shield traversed with the gun. Front plates again carried extra track links.



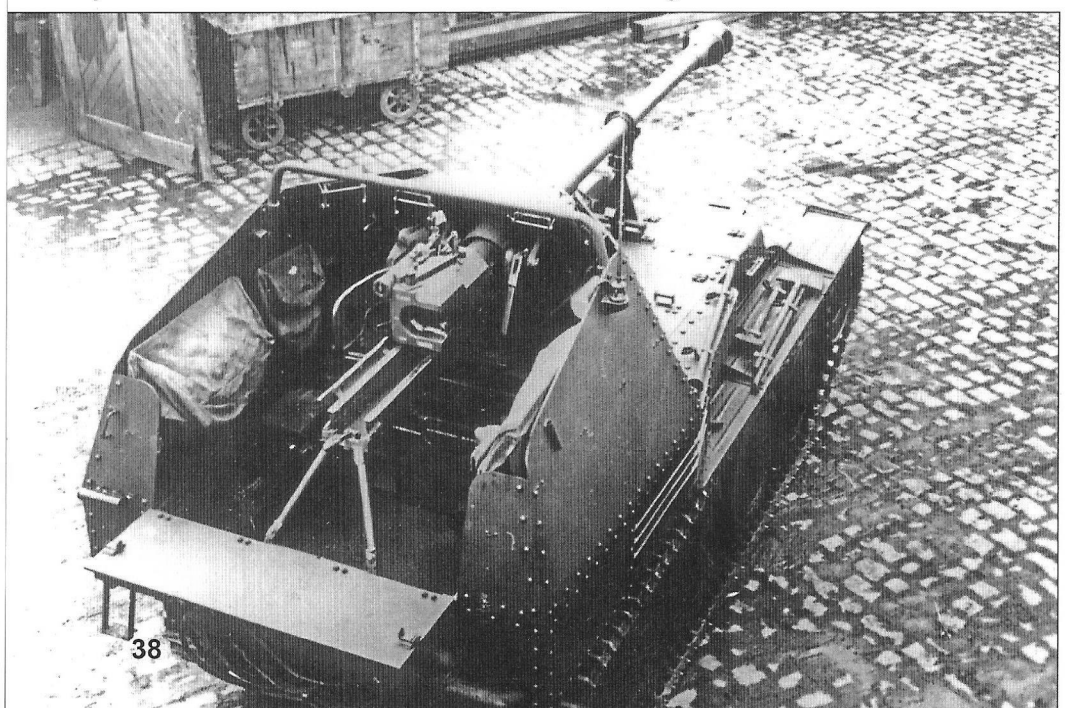
The early series MARDER III vehicle, such as this example seen from the front, is still fully riveted.

The prototype was built by BMM during the first two months of 1943. Production started immediately after the driving and firing tests. The first 20 vehicles left the factory in May 1943. The Wehrmacht obtained 373 vehicles from the 9th series, Ausf.K, already ordered in 1942. In October 1943 the production switched to the 10th series, Ausf.M, with an order for 1,000 vehicles, slated to be delivered by February 1944. Various delays in parts supplies and changes in production prolonged the deliveries up to July 1944, and in all, only 568 Ausf.M vehicles were manufactured.

At the end of 1943 the technology of manufacturing changed. The whole hull with its side additions was now welded, and riveting, which had earlier been such a prominent feature of the vehicle, was largely eliminated. The driver's hood was similarly welded and had a sharp edge. The rear superstructure was riveted as before. Because combat experience has shown that the 15mm front plate lacked adequate strength, it was replaced with a 20mm plate.

The tank hunter Sd.Kfz.138 Ausf.M with 942 vehicles delivered between 1943 and 1944 became the most numerous armored vehicle of this type both with Wehrmacht units and with the Waffen SS. In March 1944 the vehicle obtained the official designation MARDER III, a name that became so popular that all other designations faded from memory. At the same time, the newly developed Jagdpanzer 38(t) HETZER was quickly replacing the MARDER III on production lines.

The gun on this MARDER III gun is shown immobilized for transport with the front holder and rear stirrup inside the compartment securing it in place. The radio is on the right side up front, ammunition is stored in bins affixed to both sides in the rear. The rear plate could be lowered for easier access and loading of ammunition.



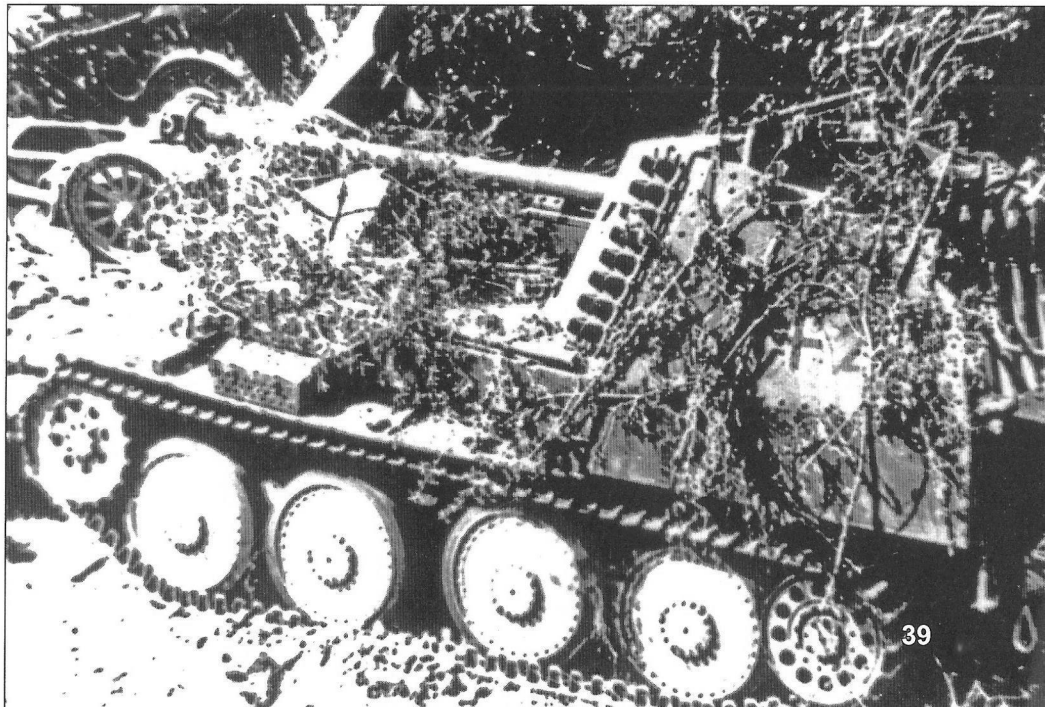
Padding on the inside of the drive's hatch is visible in this image of a late-production, welded MARDER III in France in 1944. The semi-circular cover of the gun moved with the gun during its traverse, so that at any angle the crew was protected. The vehicles carried a free machine gun, which could be mounted on the canvas support on the front of the superstructure and used for antiaircraft purposes.

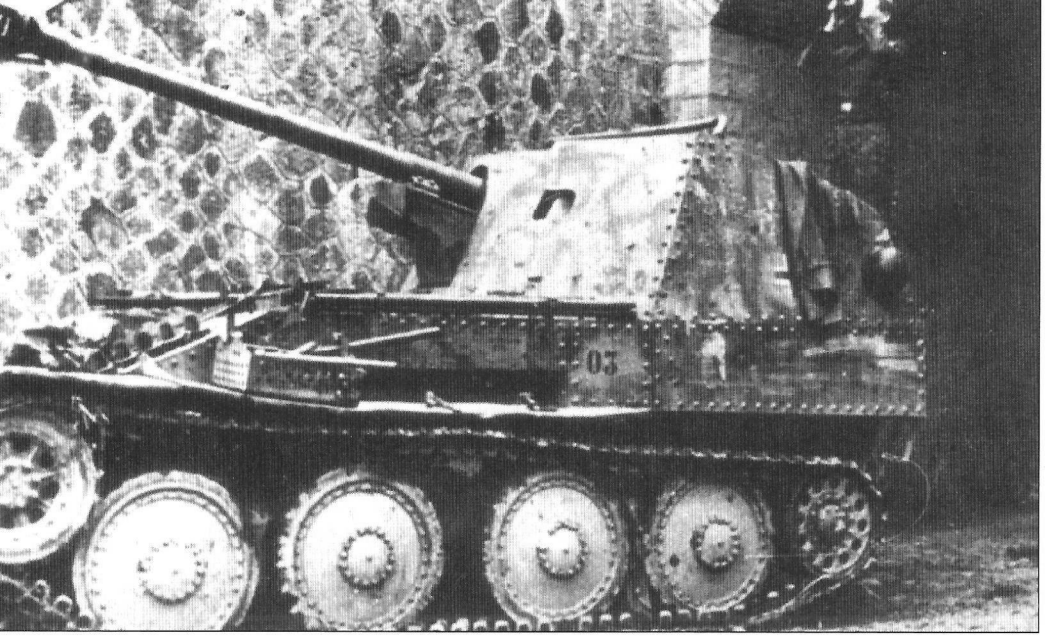
This MARDER III is fighting with Army Group Center in Russia in the winter of 1943-1944. White-wash camouflage was usually applied by hand and did not cover the vehicle completely.

This fully covered MARDER III crosses a makeshift bridge in the northern sector of the Eastern Front. The vehicle has the canvas cover up. It was fastened to the front of the superstructure and to two supporting rods on its rear sides.

This MARDER III in Russia in the spring of 1944 is camouflaged by dark green swiggles over dark yellow base paint. It carries additional track links. It was unusual for an officer to drive the vehicle, although most officers were trained to drive them.

A well camouflaged MARDER III, abandoned by its crew after Allied break-through in Normandy in the summer of 1944, does not appear to be damaged, and has many rounds for his gun, so it probably simply ran out of gas.





Observing the enemy, the commander of this MARDER III in Italy is ready to pounce. The vehicle has a makeshift camouflage and does not carry the crosses.

The unofficial white kill rings on the barrel show the number of enemy armored vehicles destroyed. The gun paintings on the side have the same purpose. The painter has differentiated between the various type of gun.

In 1943, BMM developed a kit, allowing the use of liquid gas as fuel. It consisted of two large gas cylinders in a special holder on the front plate. This modification was naturally meant only for training purposes, to save the precious gasoline. The kit could have been used on any Ausf.M vehicle, as it consisted only of the two cylinders, their holder, valves and a gas mixer. This contingency set-up was nevertheless fully functional.

At the beginning of winter 1943, a column of MARDER III vehicles sits on a mud road that has frozen but has not yet been replaced by sheer ice. The vehicles are already whitewashed, which was the usual winter camouflage used by both the Germans and the Soviets. The crew's helmets are also painted white.

15cm sIG 33 Sfl auf 38(t) Ausf.H - Sd.Kfz.138/1 Grille

During the meeting of BMM designers with their counterparts of Alkett in Berlin on 6 March 1942 it was decided to develop other modifications on the Pz.Kpfw.38(t) chassis. Aside from the tank hunters, the Germans asked for a new self-propelled 15cm infantry gun sIG 33 (schweres Infanterie Geschütz 33). These guns weighed 1,700kg in their towed version, and were manufactured during the war for infantry support. Because their maximum elevation was 75°, they were used mostly for indirect fire. Their 30kg shell had a great effect on their targets, but it took long time to emplace them and their transport was quite demanding and slow.

The design and prototype work began in March 1942, but the first production vehicles appeared as late as February 1943. The modifications of the original tank hull were much more complex than were those for the tank hunters. The gun was modified from its towed version, so that the upper part of the lafette with the cradle and barrel fitted into the cramped fighting compartment and still allowed easy servicing of the weapon.

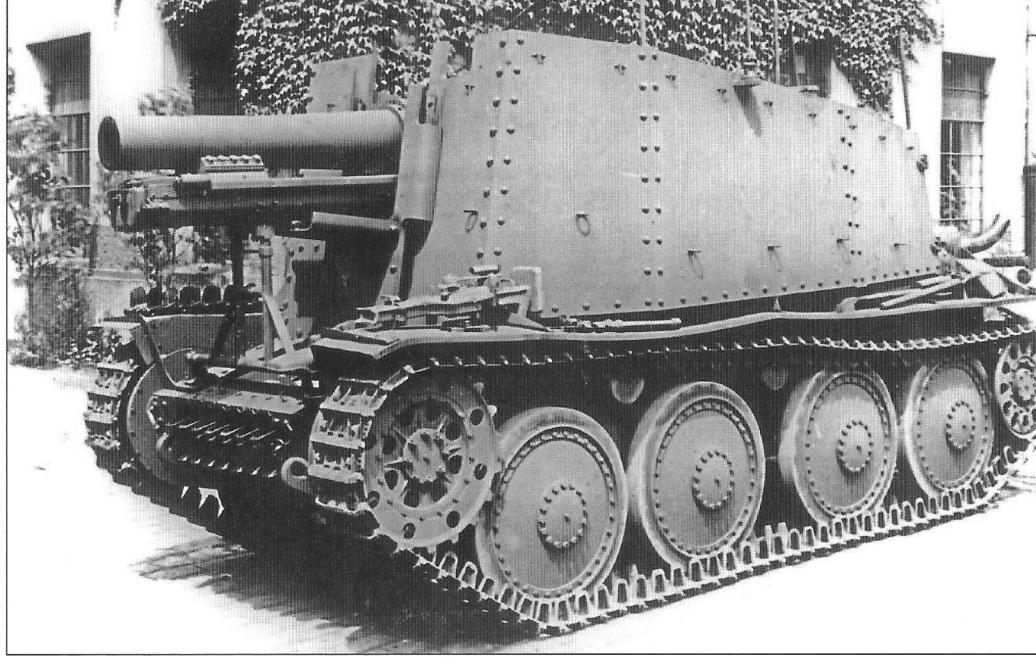
The hull utilized its original engine covers, but the top plate and the plate in front of the driver were removed. The front plate was replaced with a 25mm thick, 150cm high plate, angled at 17°, which acted also as the gun's shield. The front machine gun was removed and replaced by a free German MG 34. The driver sat on the right side behind this plate, in which he had his visor. In the middle was a large opening for the gun, and on the left side a small opening for the periscopic sight of the gun. The radio operator was moved into the open fighting compartment, where he also functioned as an auxiliary loader.

During inclement weather, the whole compartment was covered with a canvas, stretched over metal arches. The gun was immobilized during transport at zero elevation, secured by an H support and the usual stirrup in the rear to hold the breech slide. The weight of the vehicle did not exceed 10,800kg, which was comparable to the tank hunters, so its mobility was equally good.

The first 25 vehicles were shipped in February 1943, followed by 40 more in March and 25 in April. During those same months, BMM delivered another 27 vehicles, built already on the Ausf.K chassis. Between April and June 1943 another 110 vehicles of Ausf.K were delivered. The production should have stopped with these, but in November 1943 BMM manufactured another 10 vehicles.

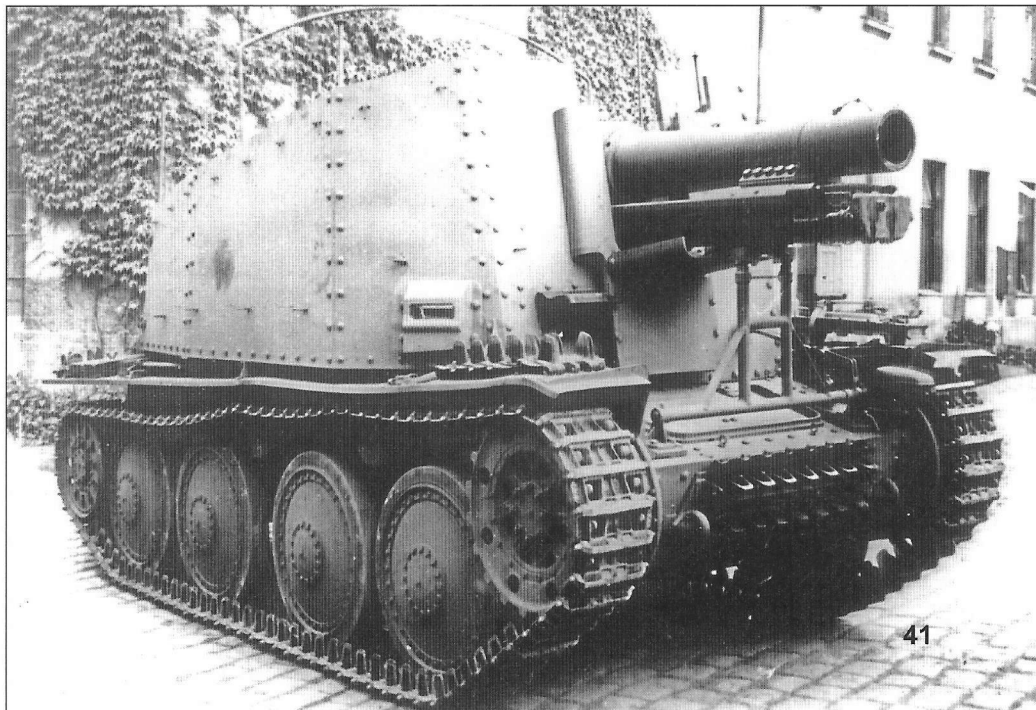
The gun was very effective, and the conversion worked well in the field. One disadvantage was that due to its small size, the vehicle could carry only 16 rounds and therefore needed re-supply vehicles, preferably Munitionspanzers. The Grille Ausf.M was already manufactured side-by-side with its supply vehicles, built on the same chassis.

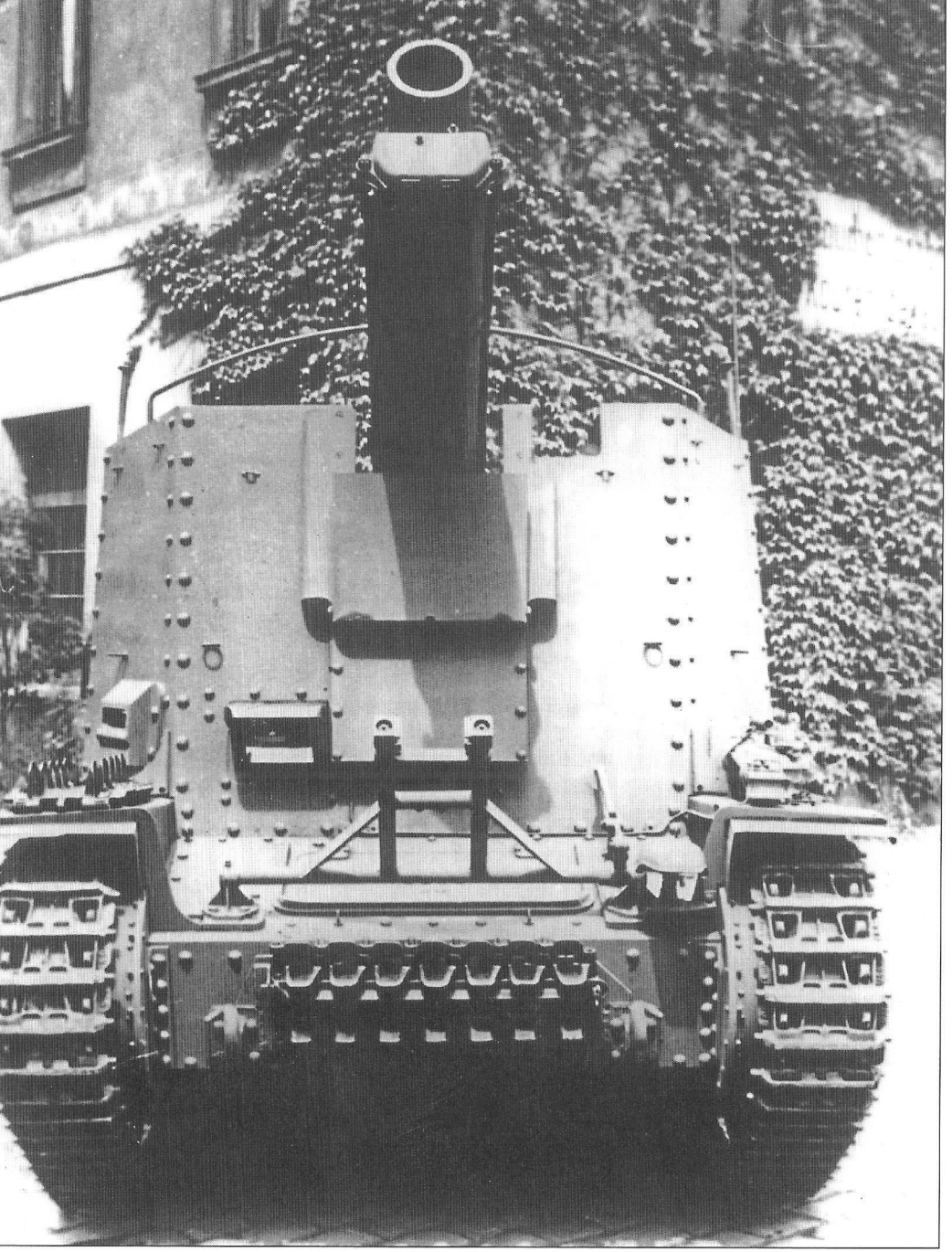
When the production of the GRILLE was replaced with GRILLE M, it was not unusual to see both models in the same unit, as any replacements were naturally the new models.



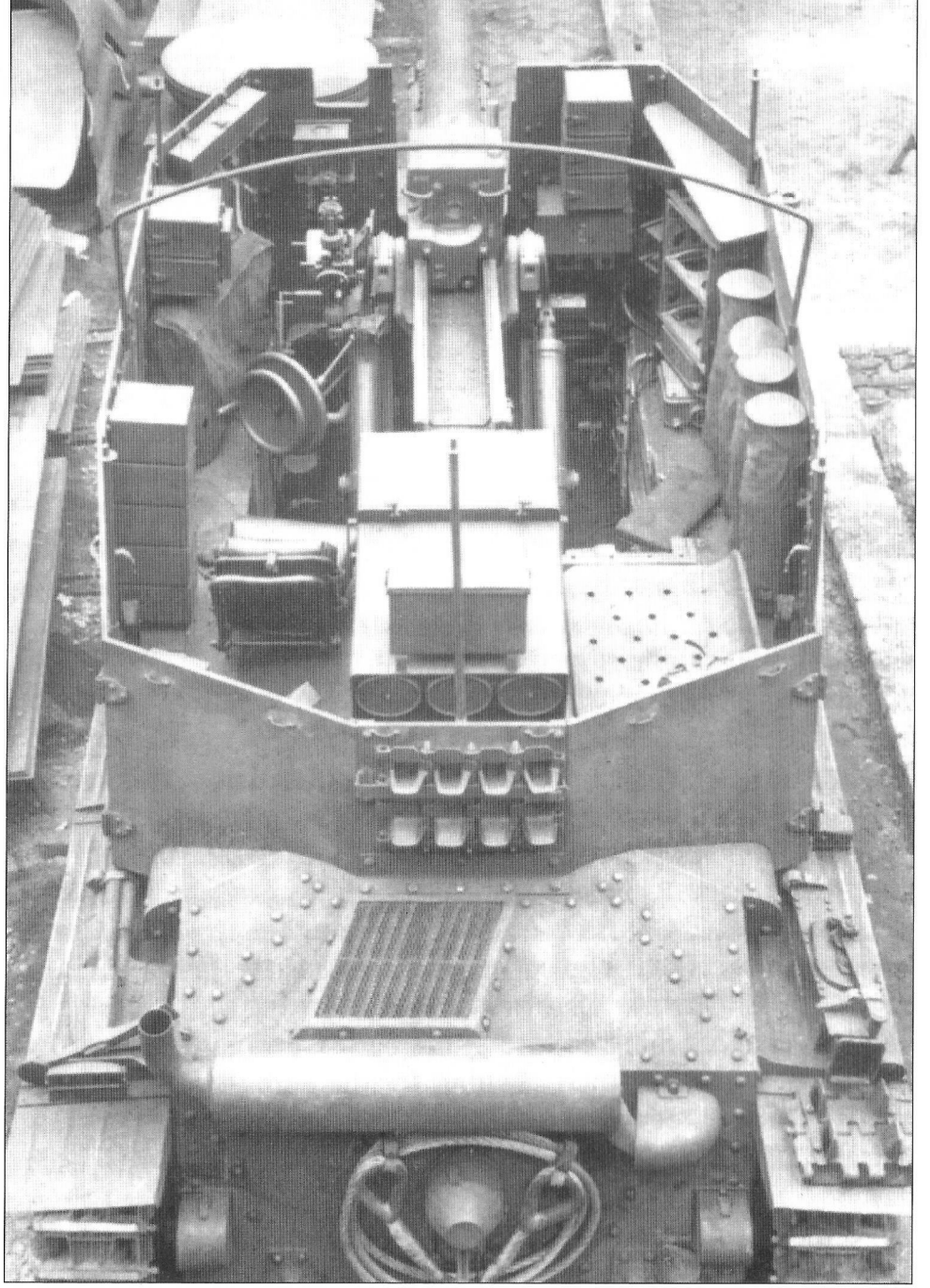
The Sd.Kfz.138/1 GRILLE carries the 15.0cm sIG howitzer on top of the hull in a fully enclosed superstructure.

Production of the Sd.Kfz.138/1 GRILLE utilized the proven chassis of the Pz.Kpfw.38(t) and included components used already on tanks and tank hunters, such as driver's cast visors. The wide superstructure precluded placing the boxes for auxiliary equipment on the fenders, so they had to be placed in the rear of the fighting compartment.

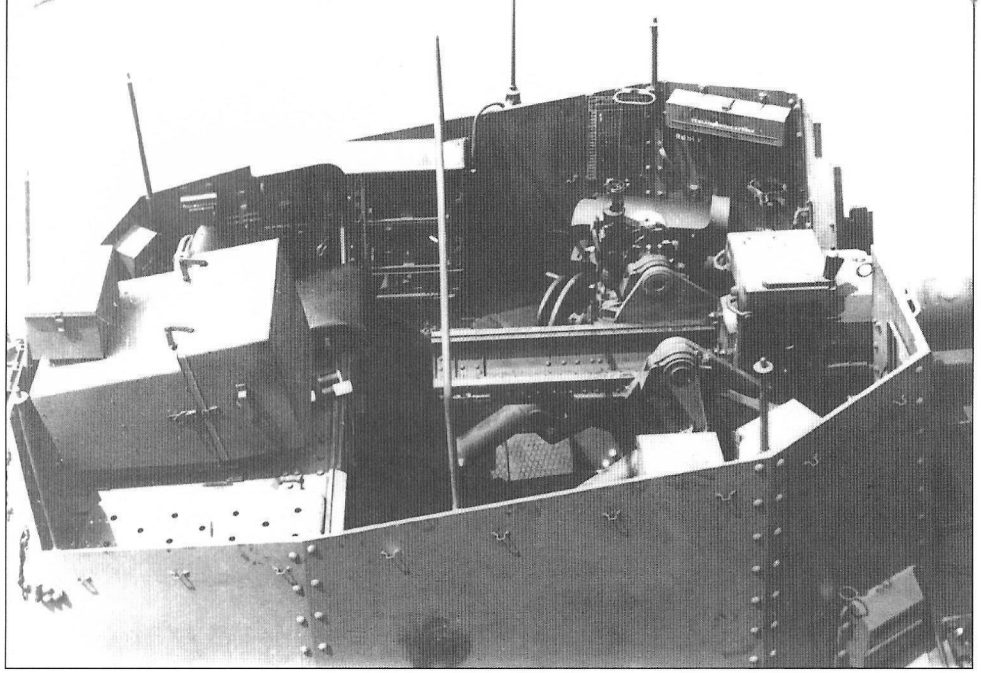




The gun on this GRILLE is at maximum elevation. When the gun is raised, the armor shield underneath it slides up to cover the resulting opening in the front armor. The gun lock here is in the lowered position. On the left side of the front plate is a pull rod that leads to the crew compartment and allows the crew to raise the lock from inside.

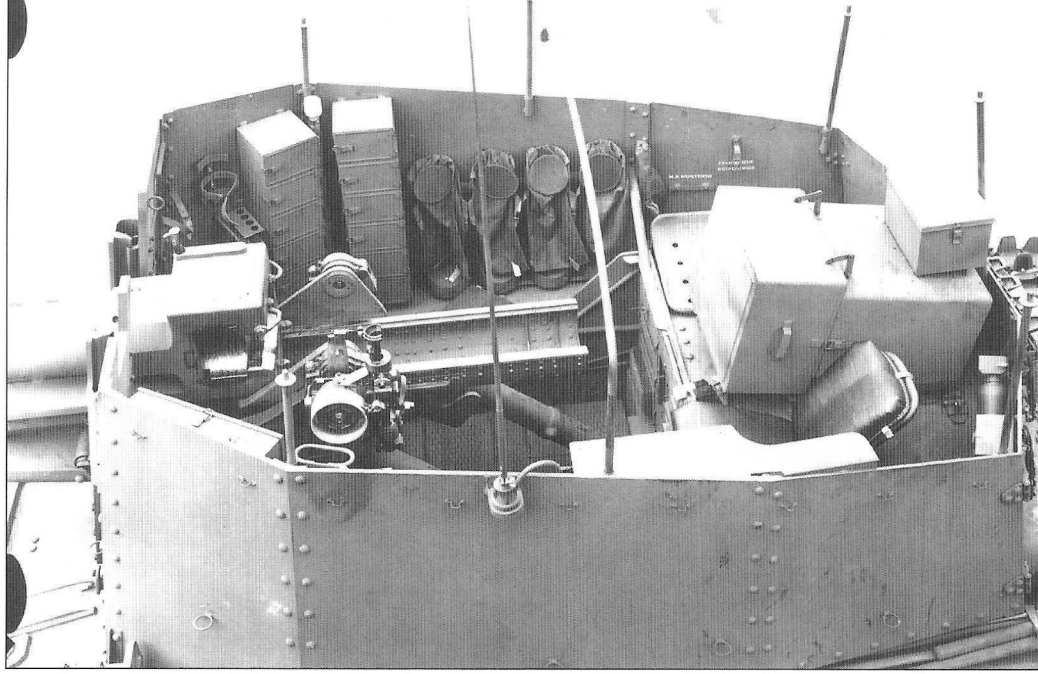


The engine covers were not changed from earlier models and inside the superstructure they were covered with perforated plates, as seen in this view of the GRILLE from the rear. On both sides of the rear armor were doors for easy entry into the fighting compartment and ammunition loading. On the left of the gun is the gunner's seat.



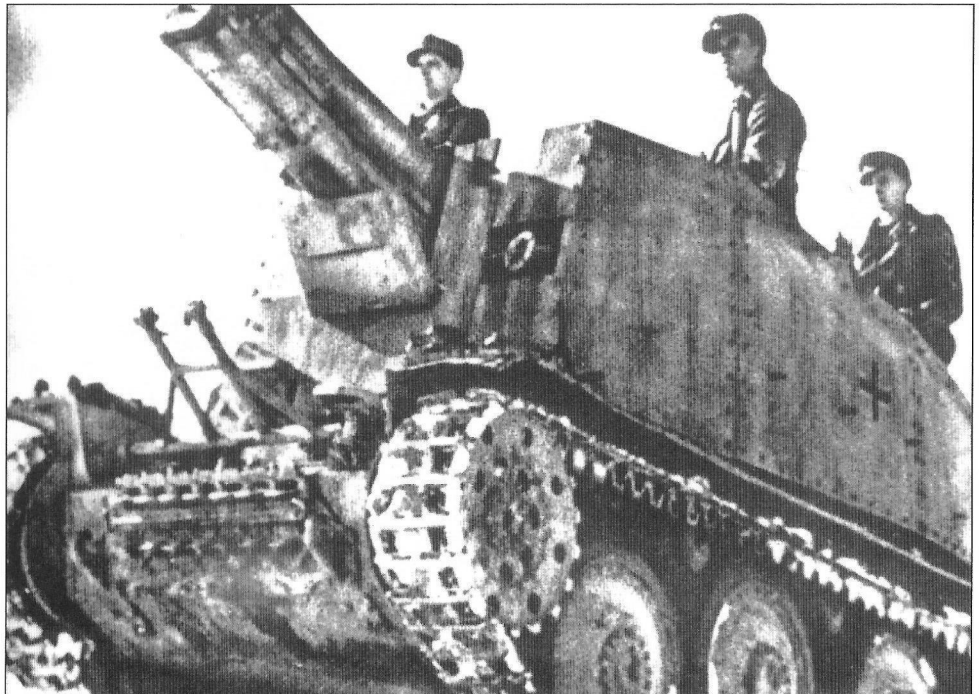
Located towards the middle of the left wall in this shot of the fighting compartment (viewed from the right) is the Fu5 radio with its aerial. In front are the howitzer's sight and elevation wheel.

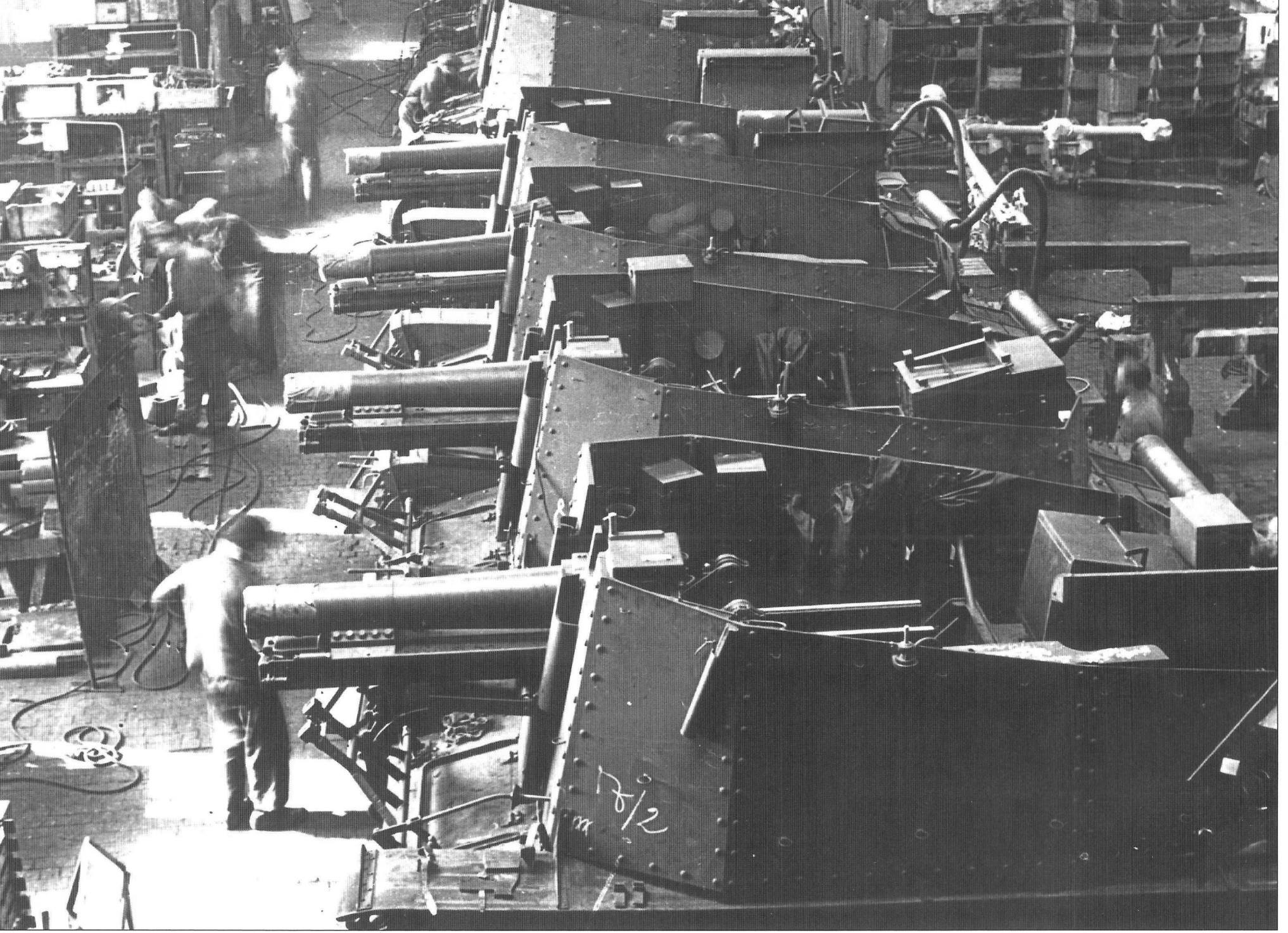
Although this GRILLE is white-washed and has snow on the tracks, the crew are wearing summer uniforms. Also, the sliding armor plate below the gun, typical for Ausf.H, is here hinged as was typical for Ausf.M.



The shells for the gun are carried in the holders visible on the side wall in this view of the fighting compartment from the left. The separate powder charges are packed in the closed boxes. Because of the cramped compartment, the vehicle could carry only 16 rounds for the gun.

The GRILLE Ausf.H was up-engined to the 150 h.p. PRAGA AC. The vehicle carried no machine gun, but the crew had two MP40 submachine guns for close defense.





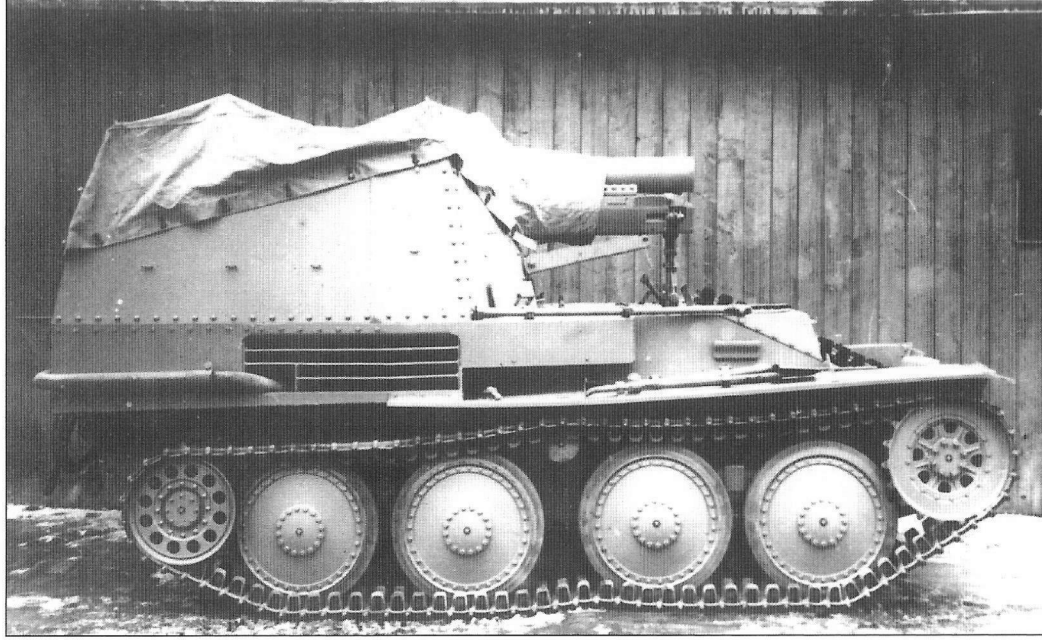
The BMM production line is busy turning out GRILLEs. A total of 200 GRILLEs were produced, 90 on Ausf.H chassis and 110 on Ausf.K.

15cm sIG 33 Sfl auf 38(t) Ausf.M - Sd.Kfz. 138/1 Grille

Once the tank hunters switched to Ausf.M vehicles, a similar conversion was ordered for the GRILLE. A 9th-series vehicle served as prototype for the self-propelled gun. Though its hull and superstructure were similar to the MARDER III's, its heavy 15cm gun and ammunition increased vehicle weight to 12 tons, cutting speed and mobility.

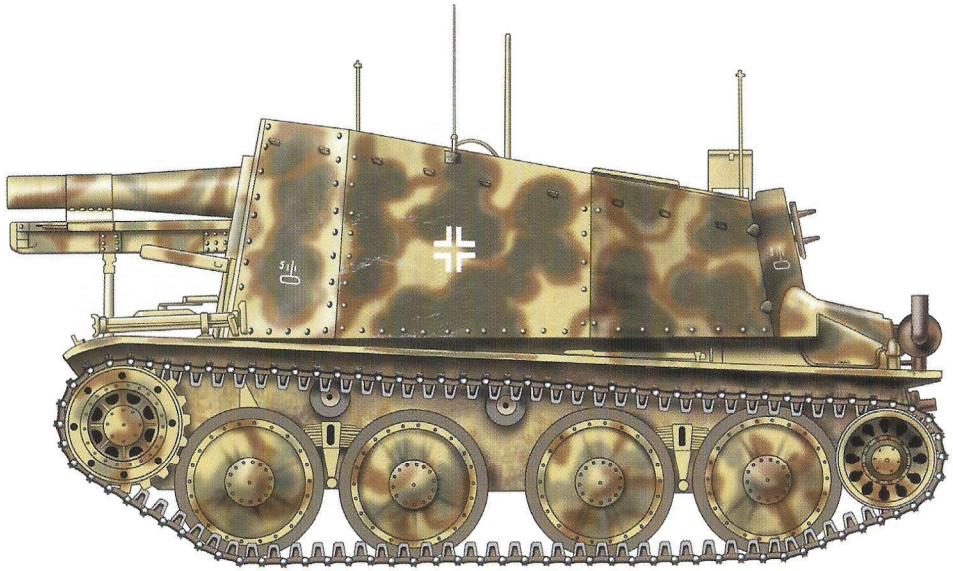
Since GRILLE Ausf.M production started in late 1943, it already used welding, similar to the almost identical MARDER III Ausf.M. The GRILLE carried only 20 rounds of ammunition, so batteries needed armored ammunition carriers. Two such carriers were planned for each six-gun battery. BMM made such carriers easily – it replaced the gun with additional holders for ammunition. The armored plate covering the front opening was fixed in place with a stirrup. These vehicles could have been modified by retrofitting the gun, even in field conditions.

The 118 originally ordered GRILLE Ausf.M vehicles were delivered between November 1943 and May 1944. An additional 74-vehicle order was placed in late 1943, to be delivered by September 1944, but delayed delivery of the guns, postponed completion of the order until April 1945. BMM also delivered 93 of the Sd.Kfz.138/1 Mun. Ausf.M between January and May 1944.

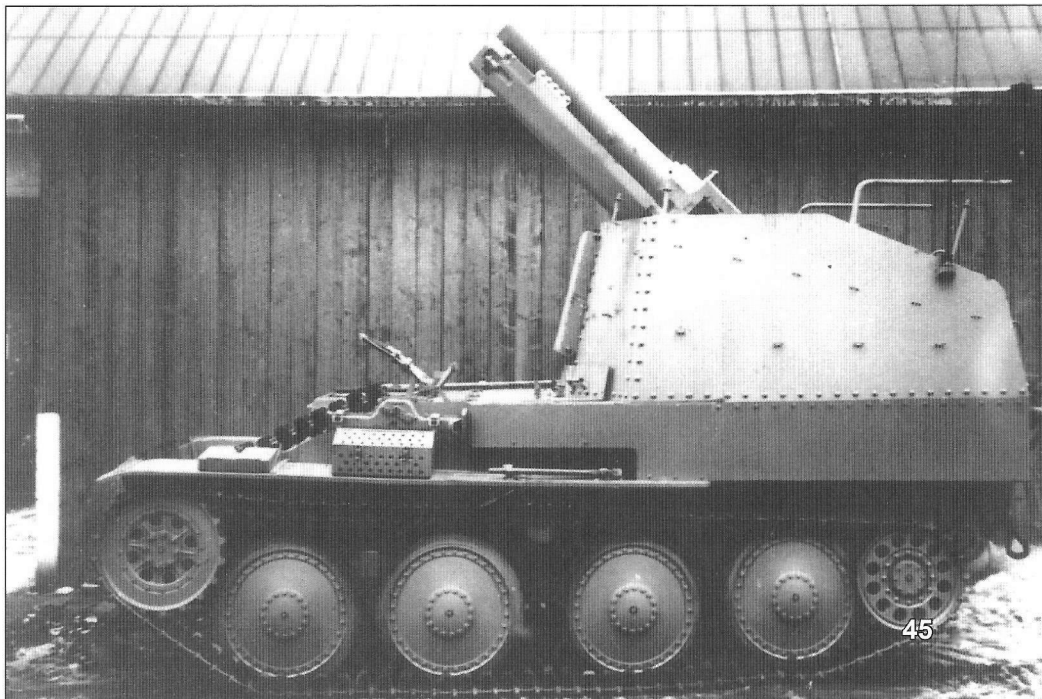


The layout of the GRILLE Ausf.M vehicle, seen here from the side, was the same as that of the tank hunter Sd.Kfz.138 Ausf.M. This vehicle is covered with its canvas roof and its hull is already partially welded. The gun is secured on the support, and the armor plate under the gun's barrel is hinged open.

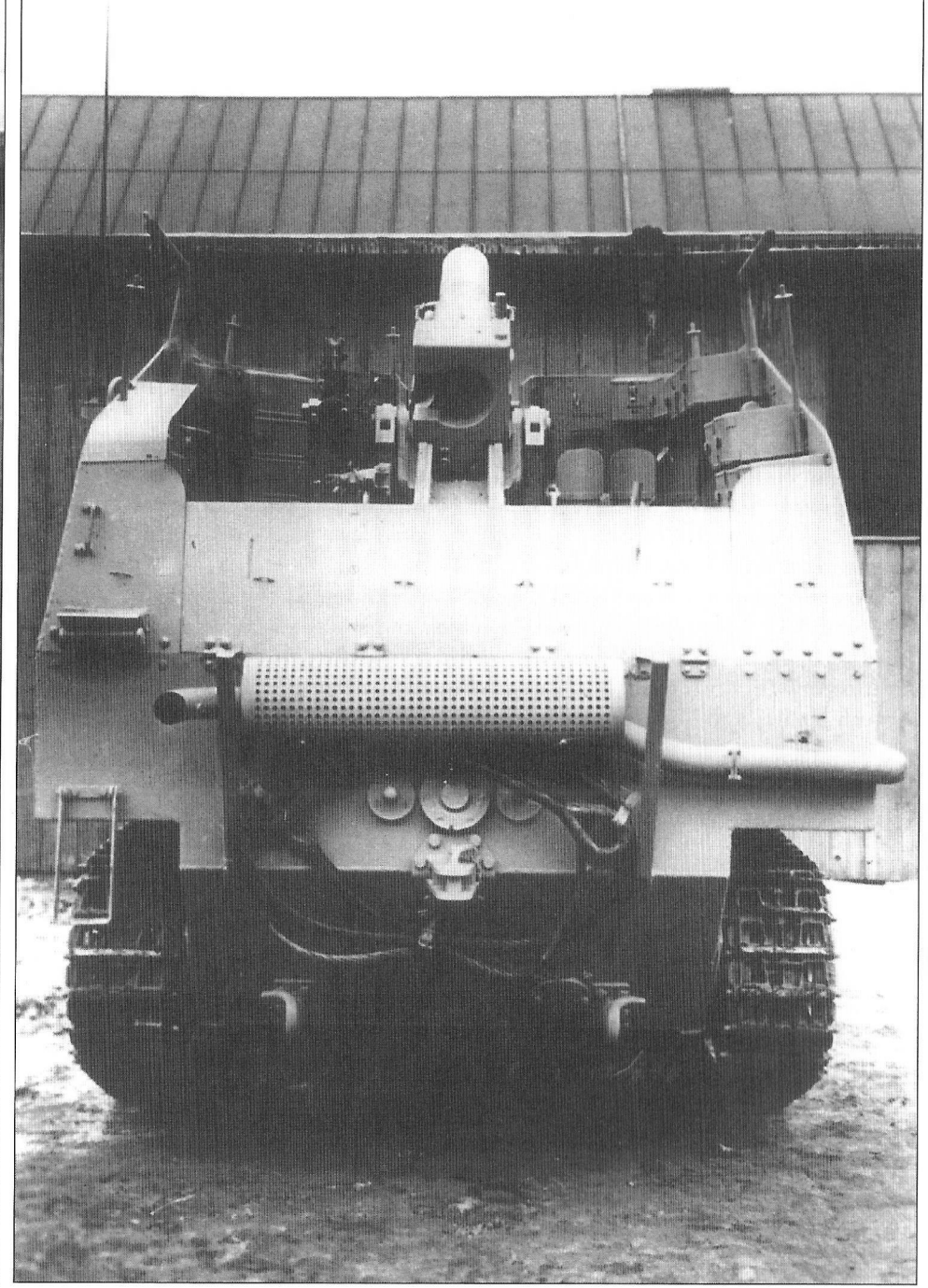
This GRILLE serves the 9/PzGren Lehr Regiment. The base dark yellow was camouflaged by a green field, bordered with red stripes. Both the Balkenkreuz and the sign of heavy assault guns were white.



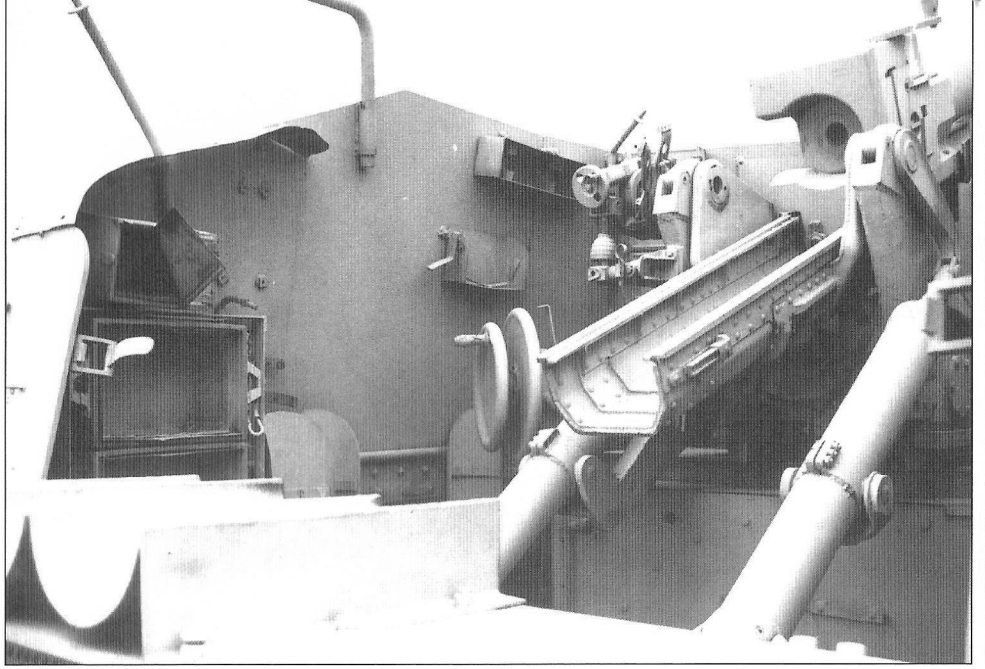
The gun is at full elevation, and the lower plate is now in the vertical position, closing the opening below the barrel. The plate was spring-loaded. The aerial for the Fu5 radio set is on the rear of the superstructure.



The cast visor of the driver is on the left in this frontal view of the GRILLE Ausf.M. Additional track links were carried on the front and angled front plates. The hatch in the front of the driver allowed access to the clutches. The gun lock is in the lowered position. The NOTEK light was carried on the left of the front edge of the hull.

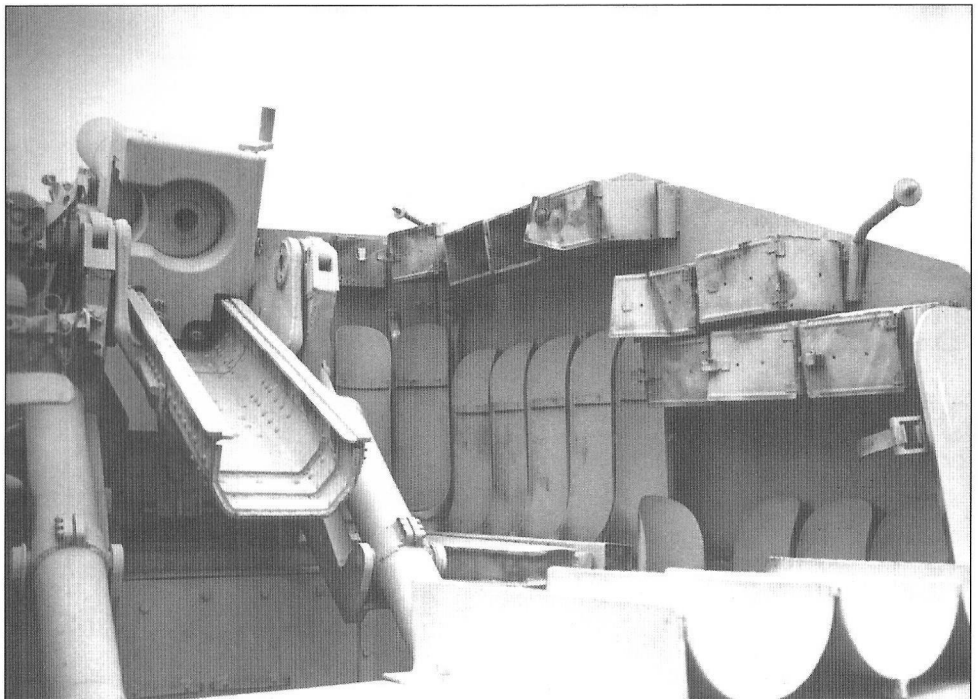


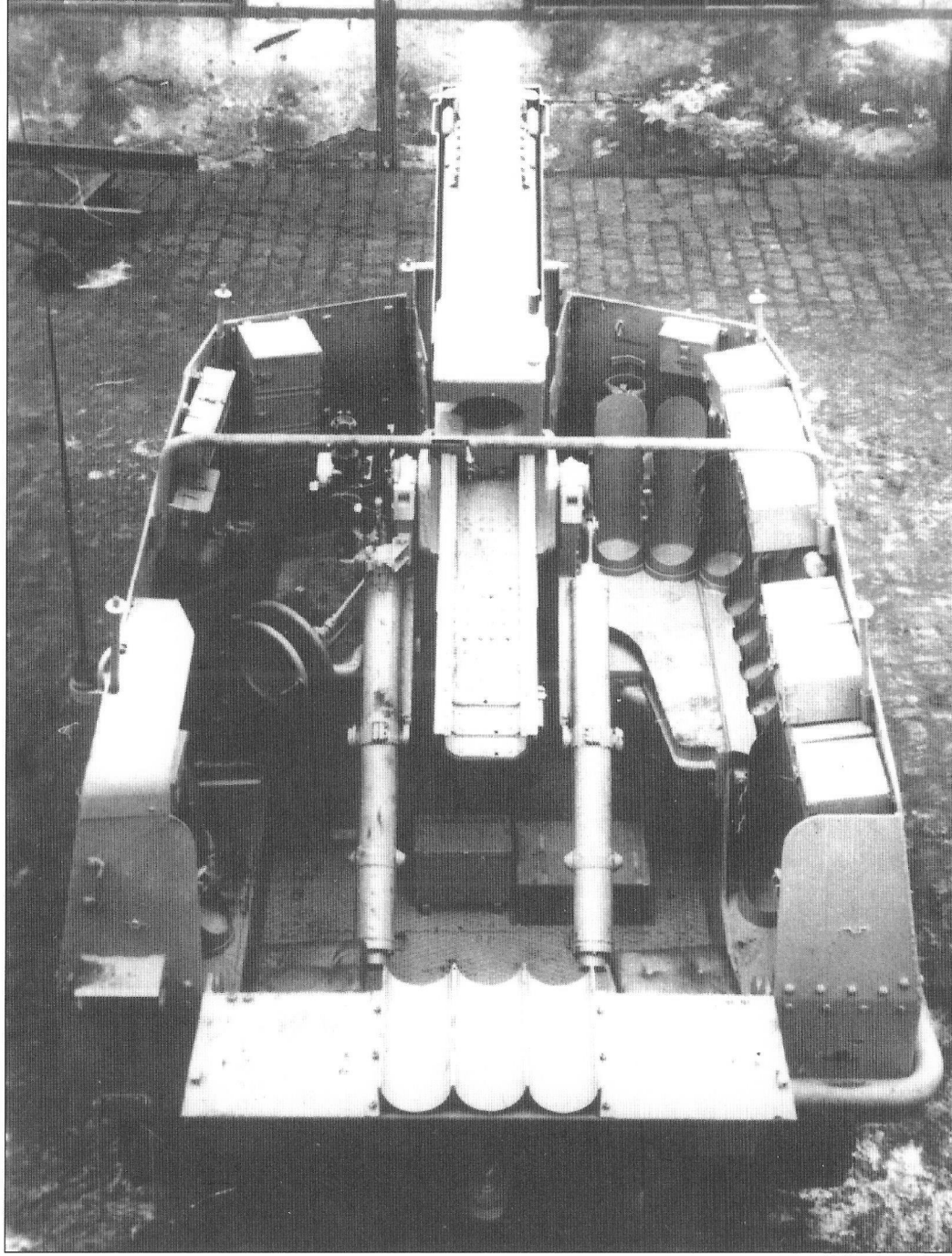
To prevent the crew from being burned by the hot muffler, the exhaust has a perforated protective cover, as can be seen in this rear view of a GRILLE Ausf.M. The rear panel was hinged and could be lowered to horizontal position. There is a little metal roof over the radio set in the rear left corner.



The massive supports of the gun and the little roof over the radio set are clearly visible in this shot of the inside of the fighting compartment of the GRILLE in the Aberdeen tank museum. The lowered rear plate features three half-cylindrical holders for ready shells.

On the right on the floor of the Aberdeen tank museum vehicle are metal holders for the shells. The powder charges were stored in the little boxes at the upper edge of the side plate.





The rear plate is lowered in this rear view of the crew compartment Around the top of the side plates are boxes for the powder charges. On the shelf on the right side of the gun are three 15cm shell, still in their protective cardboard sleeves. The gun's scope is left of the gun, behind it is the elevation hand-wheel. The gun had no traverse.

The ammunition carrier Sd.Kfz.138/1 Mun. Ausf.M looks from outside exactly like the self-propelled gun, only without the gun. The inside compartment was modified to carry the ammunition. In case of necessity, however, the vehicle could be fairly easily converted to a self-propelled gun, even in field conditions.

Flakpanzer 38(t) auf Selbstfahrlafette 38(t) Ausf.M - Sd.Kfz. 140

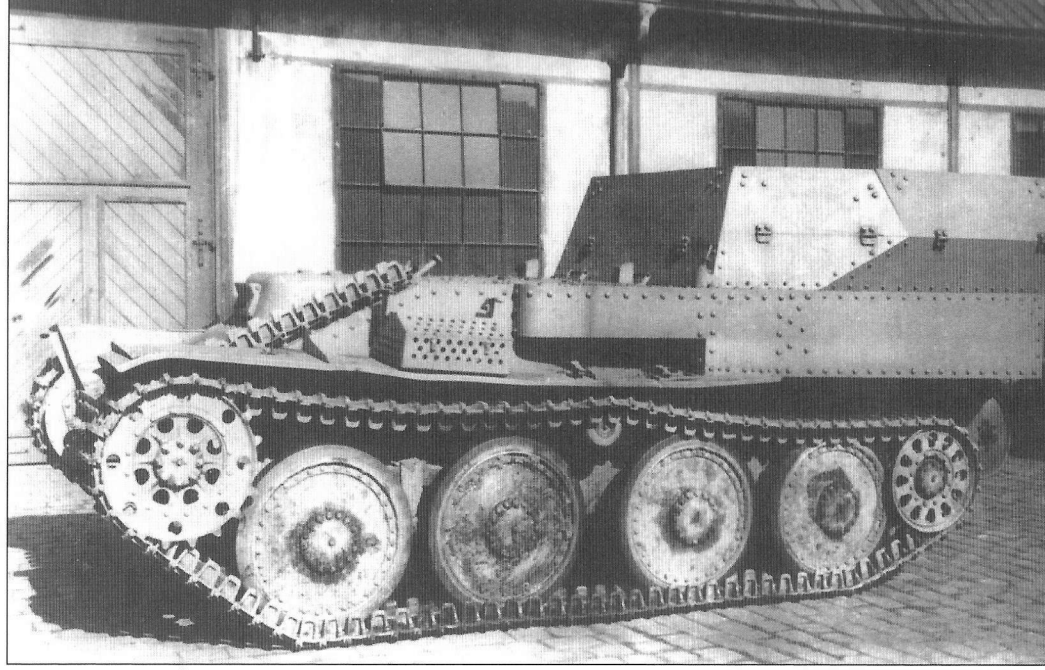
From the beginning of the Second World War it was obvious that the air forces would have an important role on the battlefields, as the side that controlled the air could move its units without hindrance while, on the other hand, preventing the movement of the enemy's units. In France in 1940 and in Russia in 1941, the Luftwaffe ruled the skies, facilitating the Blitzkrieg. Already by 1943, however, the situation had begun to change, as the Allied air forces were gaining in size and strength. In 1944, their control of the air was complete, and the Germans practically could not move during the day, unless they were ready to suffer great losses.

The Panzer Divisions had from the beginning of the war fairly large antiaircraft artillery units, but their towed guns could not be emplaced fast enough to protect the tanks during marches. For that reason, the headquarters of the armored units worked intensively to provide the armored units with self-propelled antiaircraft artillery. While the chassis of the Pz.Kpfw.IV mediums were used to carry multi-barreled or larger-caliber antiaircraft guns, the chassis of the Pz.Kpfw.38(t) was chosen as a stop-gap measure to carry a single 2cm Flak 38.

The Flakpanzer 38(t) was the last armored vehicle on Ausf.M. The armored hull and its equipment were the same as Sd.Kfz.138 and 138/1 Ausf.M, but it was riveted. The driver's cupola was the older cast type. The armored superstructure was lower and stretched more to the rear. It had an open top and was made from plates 10mm thick. At the sides and rear, the upper plates were angled inside and were hinged, allowing them to be dropped to a horizontal position. This allowed the 2cm gun 360° traverse and it could use its -5° depression when firing on ground targets. Because the front superstructure plate was moved back, the engine covers were made larger, which eased the access to the engine. At 9,700kg, the Flakpanzers were the lightest of the 38(t) modifications, and therefore enjoyed better mobility and higher maximum speed.

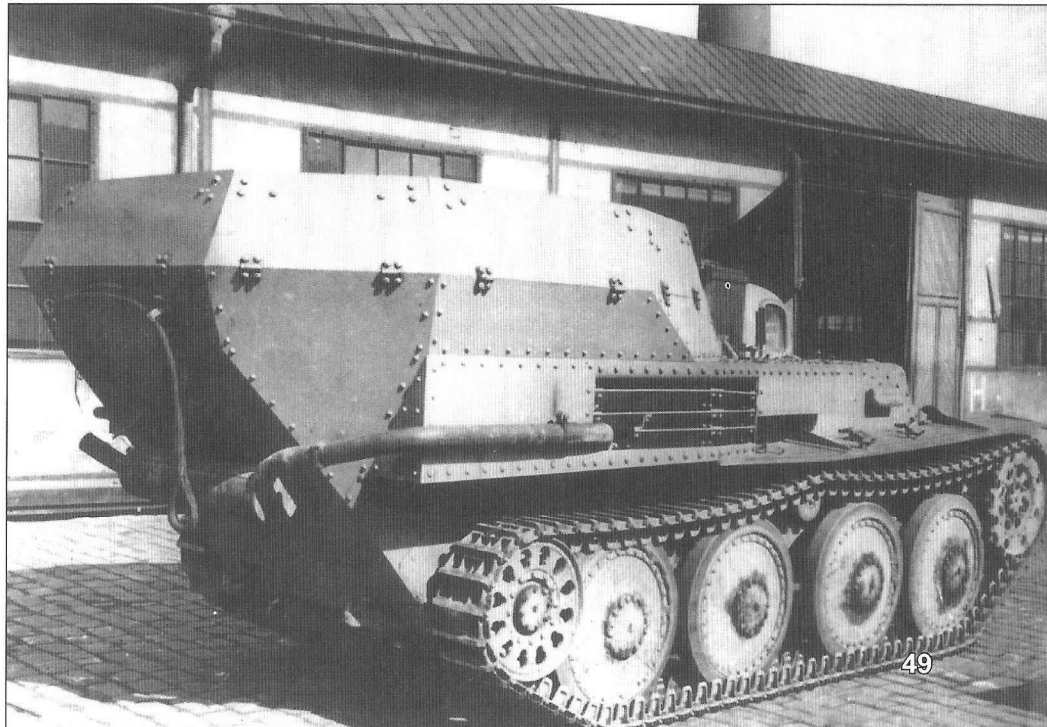
The gun was mounted on a cylindrical base, bolted to the bottom of the fighting compartment. It was fully equipped with a front shield, a catcher for spent cartridges, and gunner's seat. The 1,040 rounds of ammunition were carried in strategically mounted containers inside the superstructure. The crew of four was well protected against infantry weapons and splinters, but was fairly vulnerable to air attack. The gun was not capable of providing sufficient fire saturation, however, even when the vehicles were used in groups. But the vehicles were meant as a stop-gap from the beginning and were issued to a few divisions for a short time only.

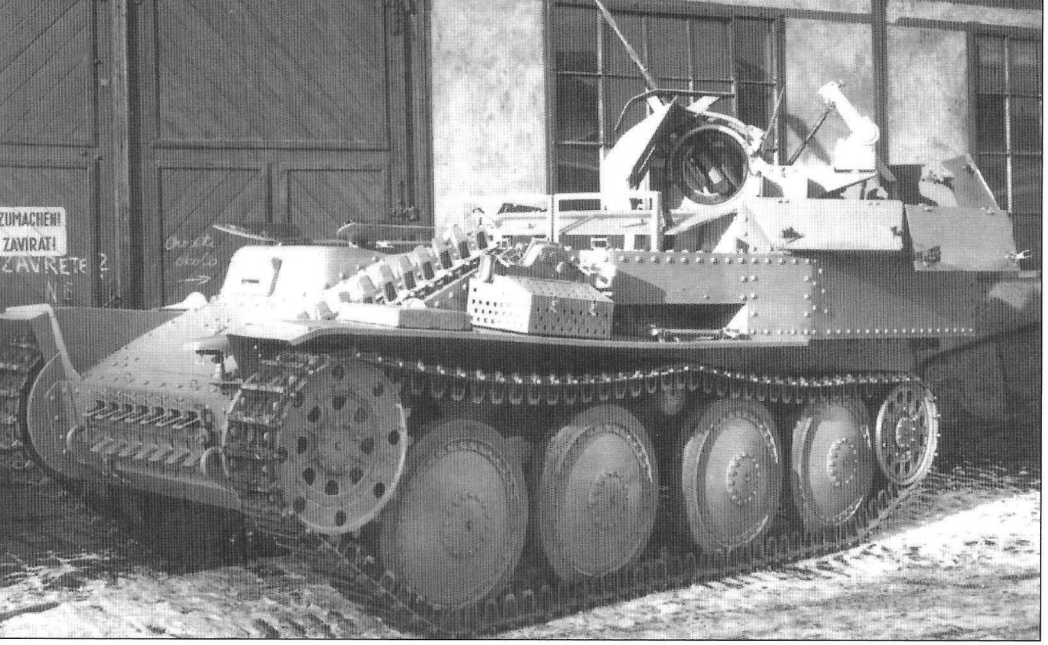
The original order for 150 vehicles was reduced to 140 vehicles even before the start of production. The remaining 10 vehicles were finished as 15cm sIG guns. First delivery was made in November 1943, and a total of 101 vehicles (including the prototype) were delivered by the end of the year. The remaining 40 were delivered in January-February 1944.



Though built on an Ausf.M chassis, the Flakpanzer Sd.Kfz.140 is another vehicle with a new superstructure. It used the original cast hood for the driver, however, and was fully riveted. The 2cm Flak 38 is not yet installed on this example.

The superstructure made from 10mm armor plates has been extended to the rear. The towing cable is stored on the rear plate.



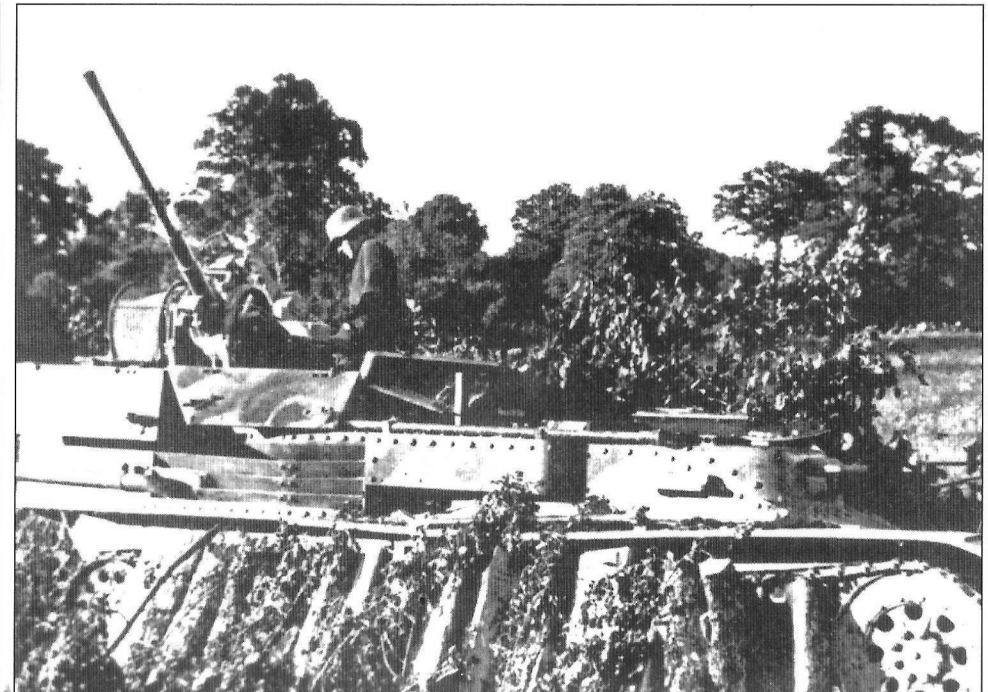


The upper plates of the superstructure are folded on this fully equipped Sd.Kfz.140. The 2cm gun has its own armored shield and aiming scope. In front of the gun on the engine cover are two frames that prevent the gunner from inadvertently firing into his own vehicle.

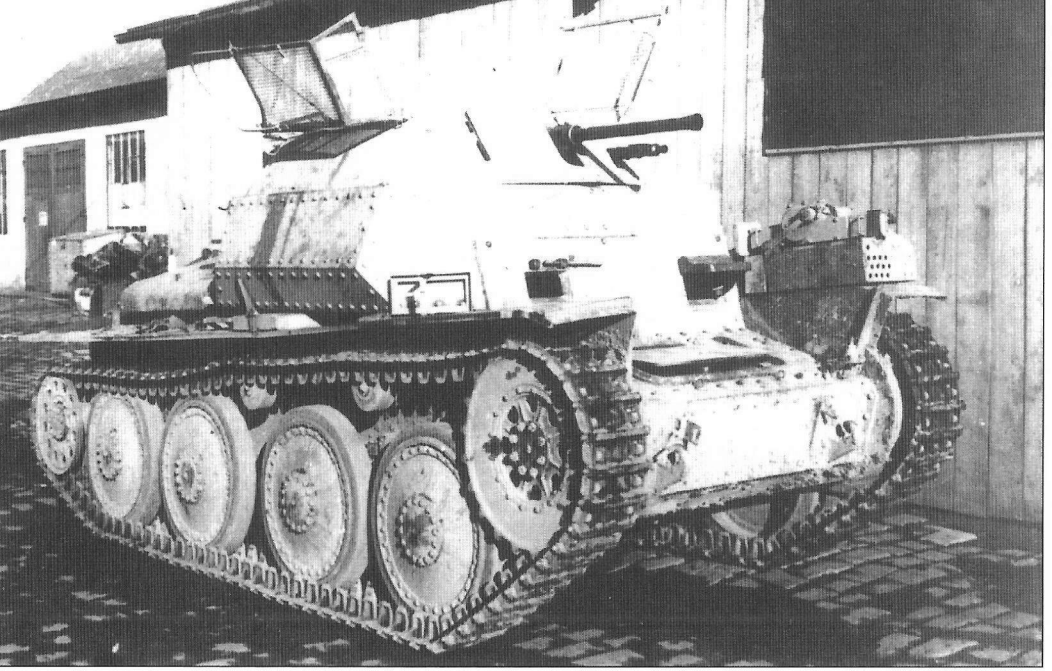
On the rear left plate of this vehicle is a fire extinguisher. The elegant superstructure provided good protection for the crew against infantry weapons and splinters, but was practically useless against the large caliber machine guns and cannons of aircraft.

Flakpanzer crewmen prepare for combat. While the gunner is already in his seat, another crew member is changing the barrel and the third is preparing the hand-held rangefinder.

Ready to fire! The gunner is looking for the enemy, while the loader prepares the magazines with the 2cm ammunition. The camouflage of the vehicle is interesting, as the branches from the sides disrupt the silhouette of the vehicle, as does the greenery on top.

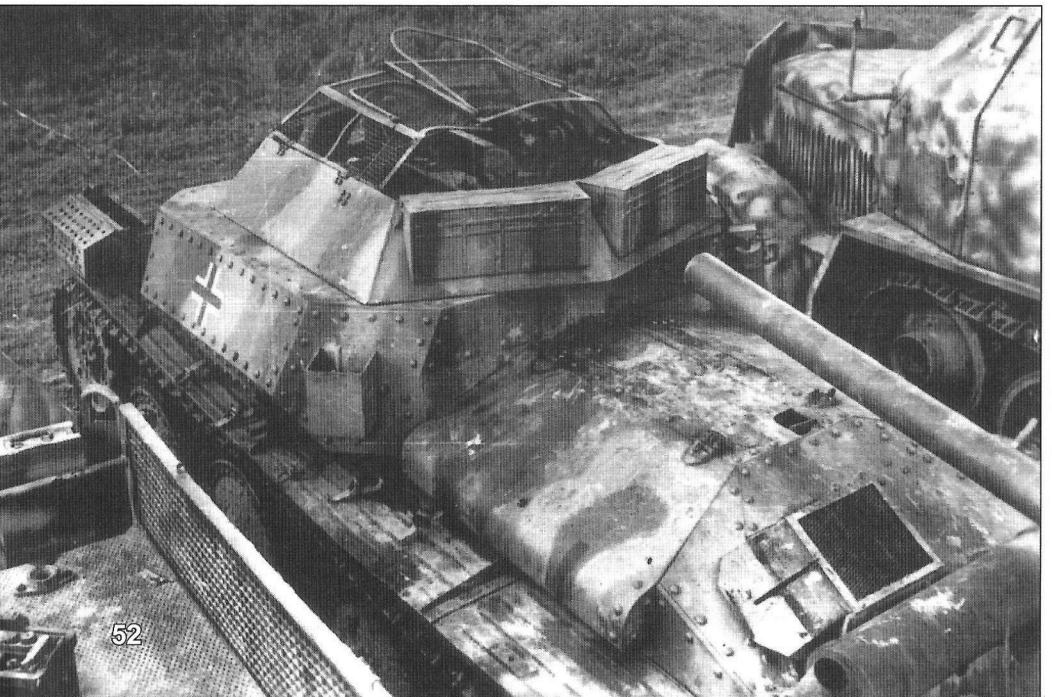


Even thorough camouflage could not save this Flakpanzer from destruction. The Flakpanzers were the prime target of the fighter bombers. Their 10mm armor and one 20mm gun could not stand the fire of the eight 50-caliber machine guns of the Thunderbolts or four 20mm cannons of the Typhoons. The driver's hatch is open, as are the engine cover and access hatch of the clutches.



Aufklärungspanzer Sd.Kfz.140/1 was the reconnaissance version of the Pz.Kpfw.38(t). The Sd.Kfz.140/1 had a new superstructure with the Hängelafette, an octagonal open-topped turret with the 2cm KwK 38 cannon and a MG42 machine gun.

Evident on this camouflaged captured Sd.Kfz.140/1 are its riveted construction, the closed covers of the turret, and the storage bins on its rear. The exhaust pipe on the muffler points upward, unlike that on the Pz.Kpfw.38(t), which pointed to the rear.



Aufklärer auf Fahrgestell Pz.Kpfw.38(t) mit 2cm KwK 38 - Sd.Kfz. 140/1

The Wehrmacht chose the Pz.Kpfw.II L as its reconnaissance light tank in 1941, but as it did not meet its expectations, in 1943 was looking for its replacement. BMM tried to offer its original reconnaissance tank, the Pz.Kpfw.38(t) n.A., but because its engine and some sub-assemblies were not being manufactured, production of the vehicle would have been delayed. BMM, therefore, had to revert to the original Pz.Kpfw.38(t).

BMM obtained the order for a new reconnaissance tank in summer of 1943. It specified a mock-up of the new armament, followed by three test vehicles.

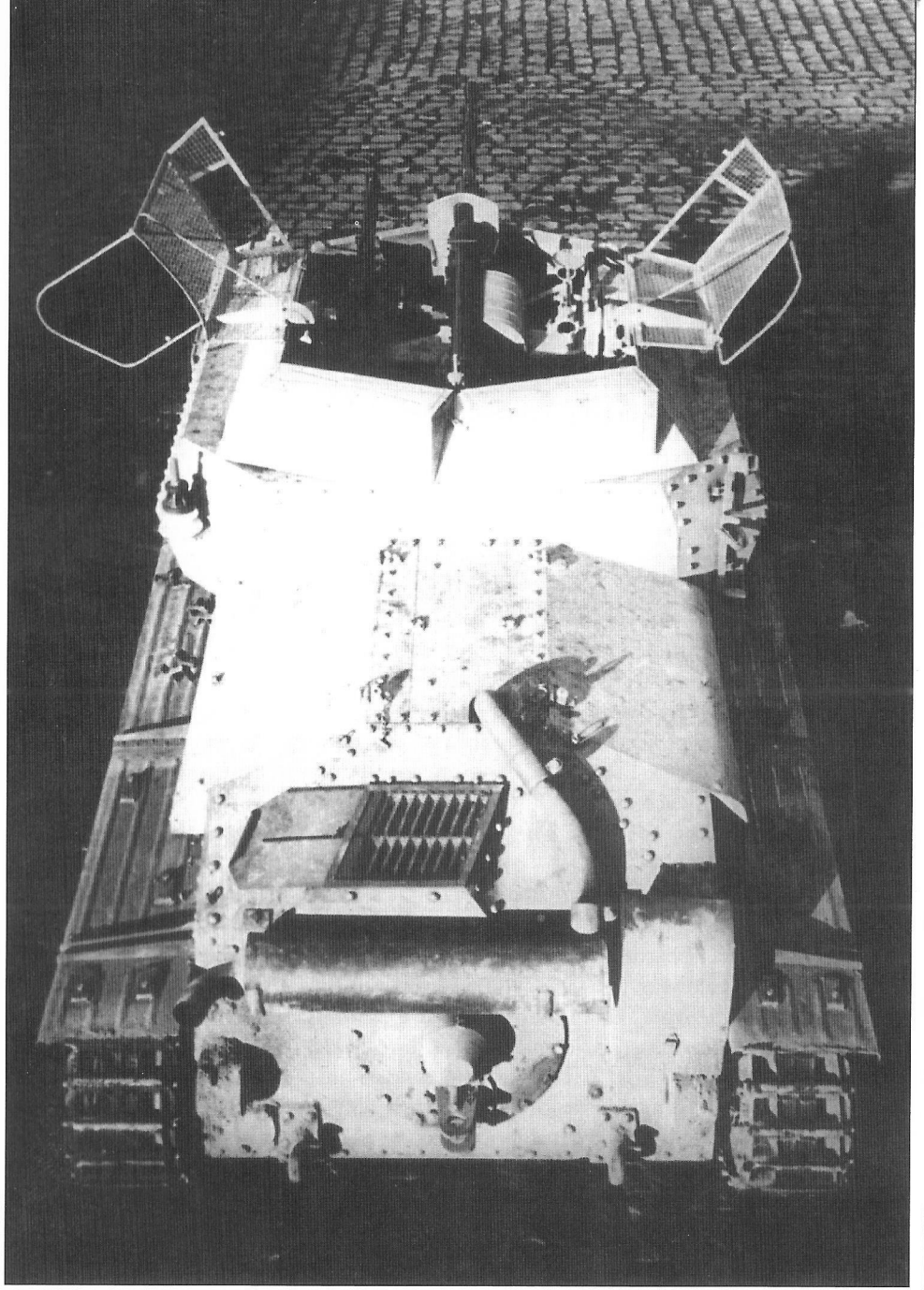
Two types of armament were specified – 2cm KwK 38, and 7.5cm KwK 51. In the end, the vehicles with the 7.5cm gun remained as two mock-ups, while the vehicles with the 2cm gun went into production. Because the production was switched in 1943 to the Ausf.M vehicles, BMM made the original chassis of tanks with the engine in the rear, using armor plates stored for tank repairs and replacements. The stronger AE engine gave the 9,500kg vehicle high speed on roads and excellent cross-country mobility.

In the winter of 1943-1944 the prototype and the three test vehicles were subjected to a rigorous driving test. Interestingly, instead of the turret they carried weight that brought their weight to 13.5 tons – the expected weight of the planned Jagdpanzer 38(t). Thus they served for the upcoming BMM's main production program as well.

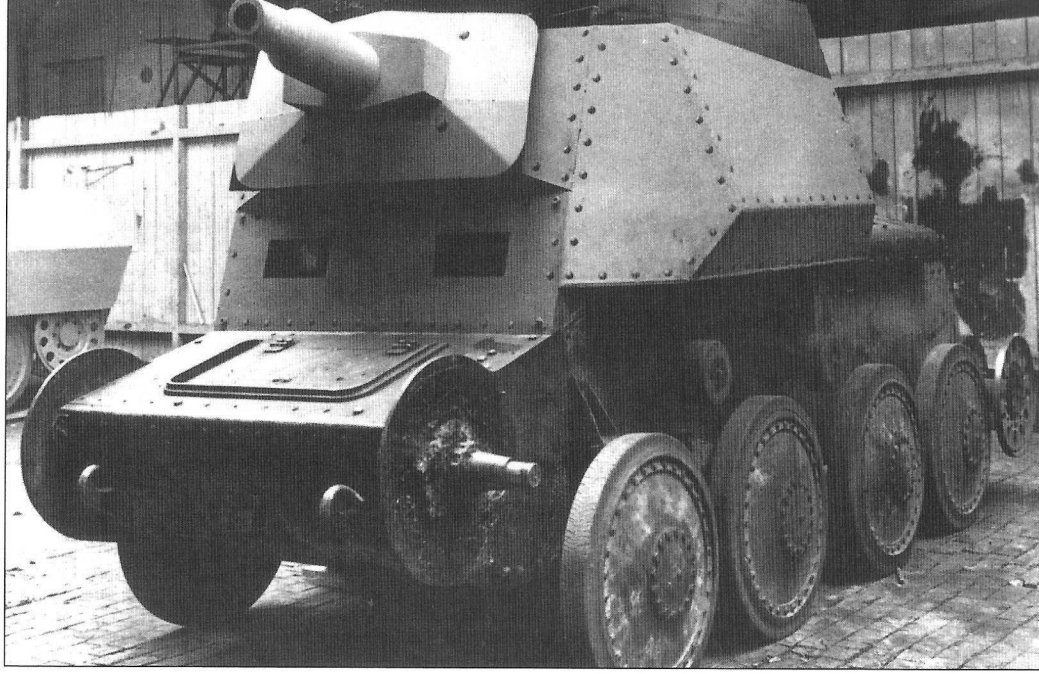
On the sides of the fighting compartment above the tracks was built a new, boxy octagonal superstructure. Its upper angled plates were 10mm thick, lower vertical plates were 15mm thick. This fixed superstructure formed the basis for a hexagonal rotating turret in which the 2cm KwK 38 and a coaxial MG 42 machine gun were mounted. Both weapons had a full-circle traverse and high elevation. The turret was open from above, and was protected against hand grenades by a two-part hinged frame with a wire mesh cover that was taken over from the Sd.Kfz.234/1 heavy armored cars, and the German company Appelt supplied it complete with the armament. The front machine gun in the hull was deleted. The front driving sprockets had increased diameter with 20 teeth, instead of the normal 19. This was necessitated by altered gearing.

The vehicles were part of the 10th series of Ausf.M at the time the production of tank hunters and assault guns with the engine in the middle was in full swing. As this model reverted back to the original configuration of Pz.Kpfw.38(t) with the engine in the rear, BMM had to utilize chassis of tanks returned from the front, and for the new superstructures use armor plate used for their repairs.

The production of the Sd.Kfz.140/1 ran in February (37 vehicles) and March (33 vehicles) 1944. In February and March 1944 the delivered vehicles were supplied to Aufklärungs Abteilungen (reconnaissance battalions) of various Panzer Divisions. They were successful, but their small numbers could not influence the battle readiness of these units in the last years of the war. The Aufklärungspanzer 38(t) was the last armored vehicle designed on the chassis of the light tank Pz.Kpfw.38(t).

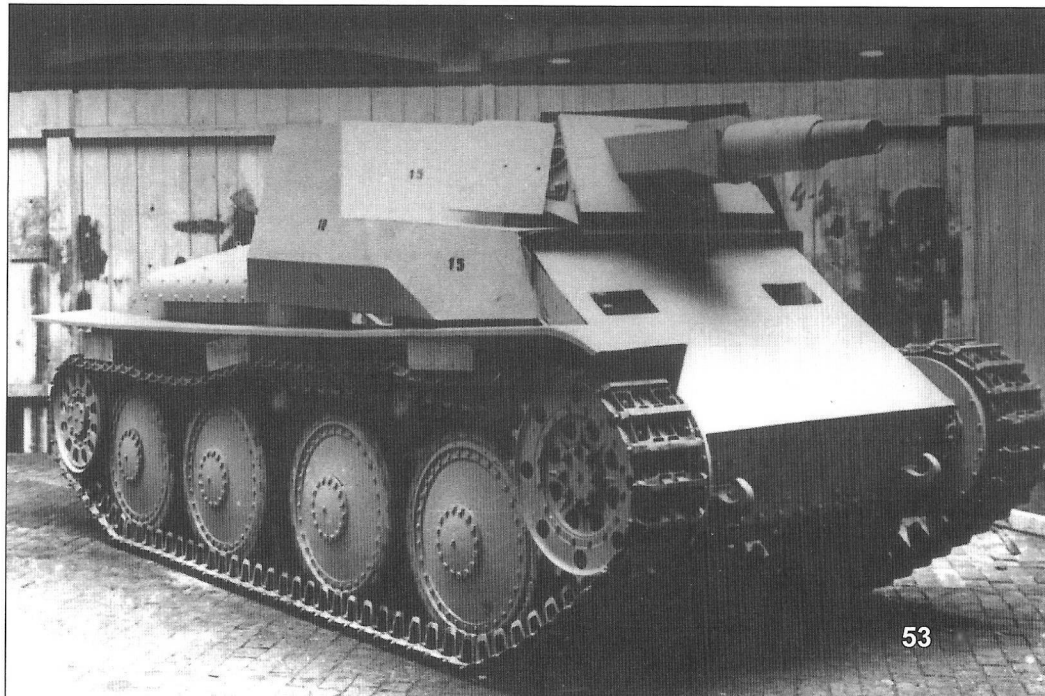


A rear view on the Sd.Kfz.140/1 shows the standard engine covers and the widened superstructure. The turret had top covers of wire mesh on frames to protect against hand grenades. The gun was in the middle and the machine gun on its left. The radio set was in the rear left corner.



For the Aufklärungspanzer Sd.Kfz.140/1 the 7.5cm KwK 51 gun was also envisaged as its main armament. Two prototypes were built. This one has the gun mounted high in a riveted superstructure, and retains the front plates of the Pz.Kpfw.38(t).

The second prototype of the Aufklärungspanzer Sd.Kfz.140/1 has the front plate simplified and angled, and the superstructure lowered. This prototype was only a mock-up with the superstructure made from plywood.



Production of Pz.Kpfw.38(t) modifications at BMM

Type	Year	New	Rebuilt	TOTAL
Sd.Kfz.139	1942	344	39	383
Sd.Kfz.138	1942-1943	275	336	611
Sd.Kfz.138M	1943-1944	942	N/A	942
Sd.Kfz.138/1	1943	200	N/A	200
Sd.Kfz.138/1M	1943-1945	203	N/A	203
Sd.Kfz.138/1Mun	1944	93	N/A	93
Sd.Kfz.140	1943-1944	141	N/A	141
Sd.Kfz.140/1	1944	N/A	70	70
TOTAL				2,643

The armored infantry and ammunition carrier Mannschafttransportwagen und Munitionstransporter auf Fahrgestell 38(t) Motor Mitte is built on the Ausf.M chassis. This rear view shows the heightened rear top armor with a two-piece door and a step to help crewmembers get aboard. The exhaust muffler was placed under the steps. The vehicle was mostly welded. The line on the side of the superstructure shows how the new rear part was added to the original side armor of the Ausf.M. The engine's air intake is located behind the driver's position and driver's side periscope.

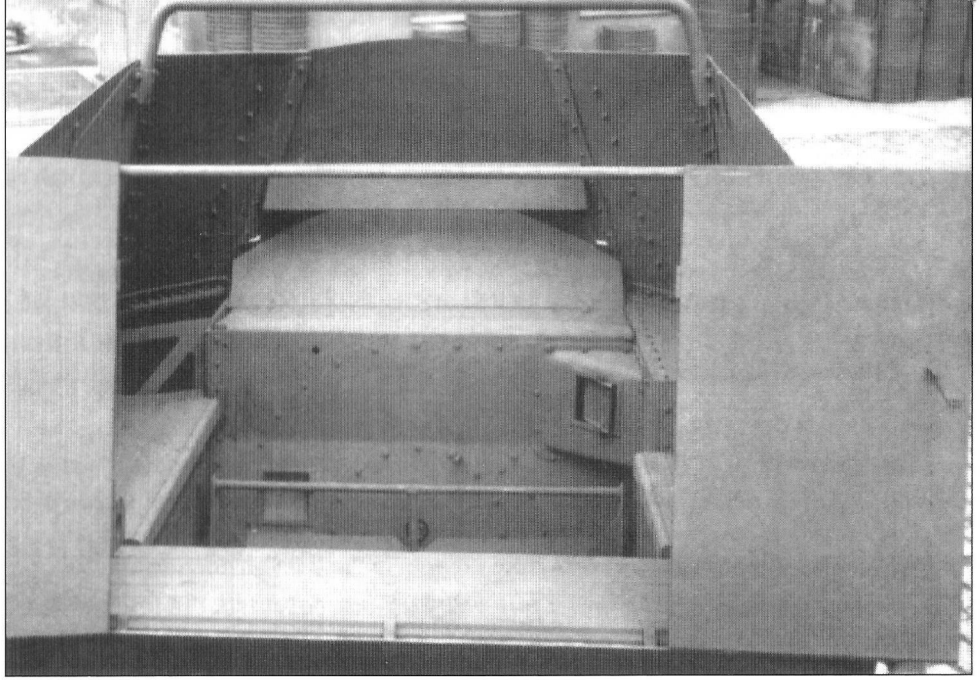
Other Planned Developments

In 1943 BMM was developing various modifications of the new Ausf.M vehicle. One of them was an ammunition carrier and an armored personnel carrier, or Manschafttransportwagen und Munitionstransport Wagen auf Fahrgestell 38(t) Motor Mitte. On the prototype the gun was removed and its opening was covered with an armor plate. The side plates were heightened to improve crew's protection, and in the rear two-part door allowed easy access. The crew compartment could accommodate eight soldiers on wooden benches on the sides. The further fate of the prototype is unknown, but it was never produced.

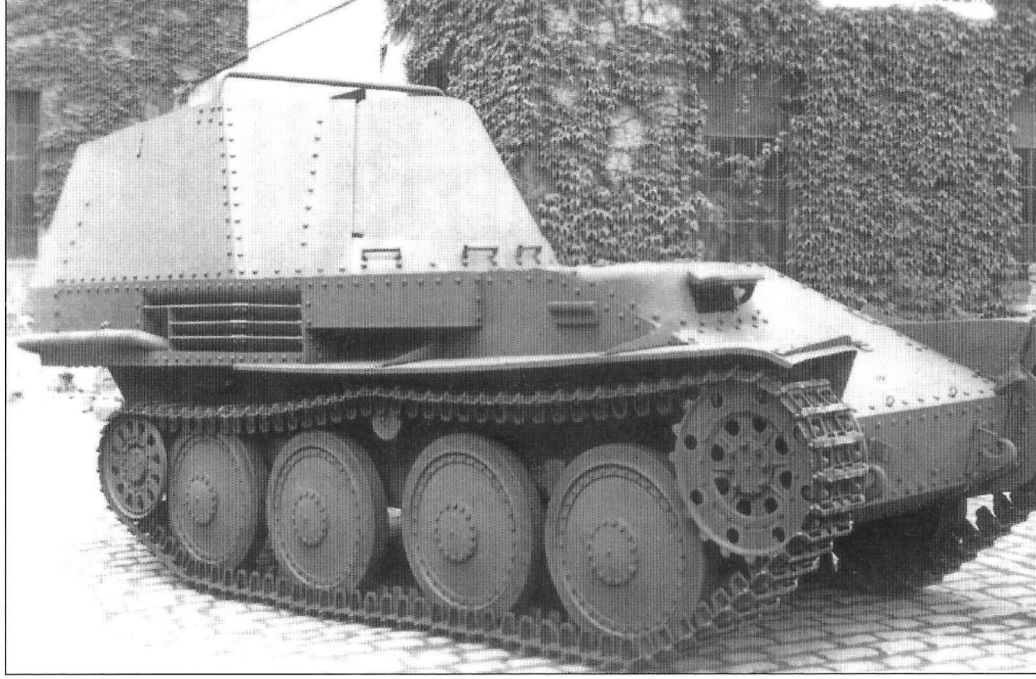
The next prototype of a mortar carrier was built only as a mock-up, its superstructure fashioned from plywood. The superstructure had a "coffin" shape, similar to the Sd.Kfz.251 half-track carrier. The frontal angled plate went all the way to the top of the fighting compartment, which was open from the top. This vehicle also featured a two-part door in the rear. The mortar was fixed to a rotating base in the middle. As the Wehrmacht lost interest in this vehicle, further development was stopped in 1944.

In late 1944 Adolf Hitler decreed that henceforward all German tracked armored vehicles will be based only on two chassis: Pz.Kpfw.38(t) for the light ones, and Panther for the heavy ones. This led to development of the above prototypes, and also later the Waffenträgers. The armored infantry or ammunition carrier could have replaced the Sd.Kfz.251 half-tracked carriers, but the Kätzchen (see later) was a much better design, lower, with engine in the back and more convenient interior arrangement. At the end it was decided to keep the Sd.Kfz.251 in production and concentrate the use of the Pz.Kpfw.38(t) chassis for tank hunters and assault guns.

The situation at the end of 1944 did not allow introduction of new types, however promising, because the industry had to concentrate on manufacturing already accepted and proven types to keep pace with the losses.



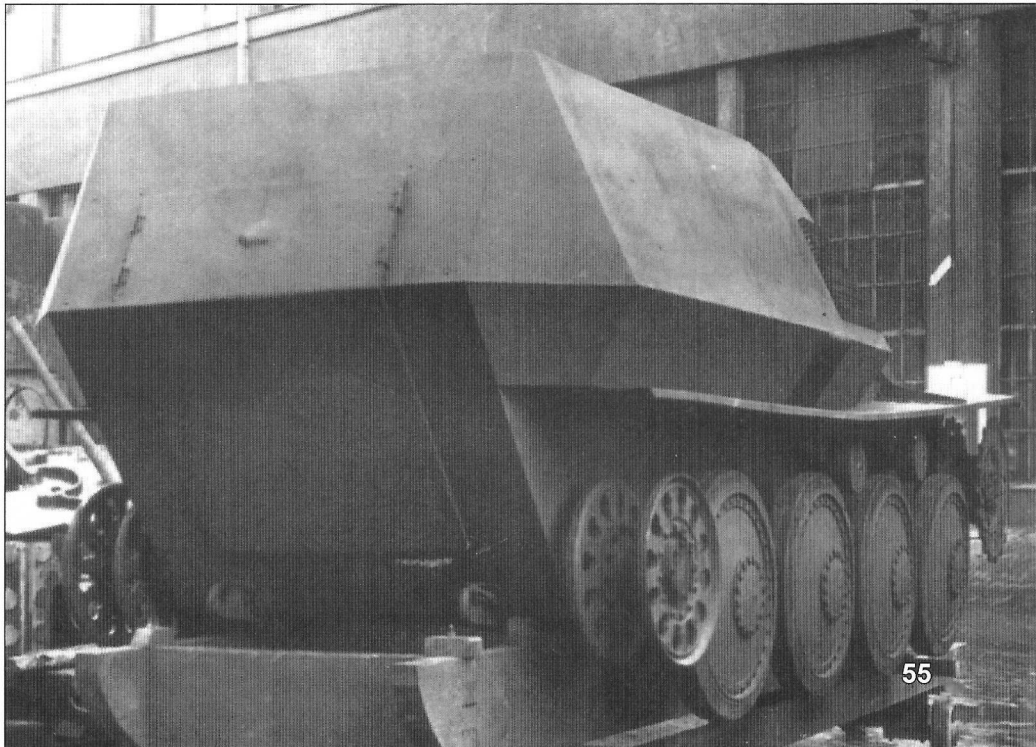
Eight men is the capacity of the crew compartment in the planned infantry and ammunition carrier with ammunition storage bin up front and crew benches in the rear.

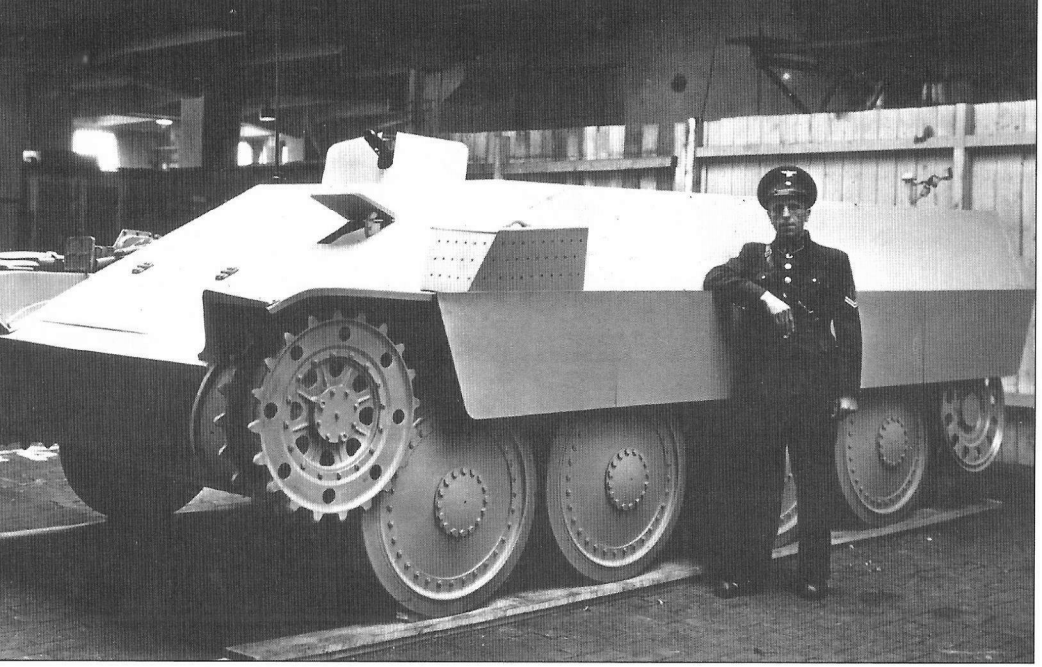


The vehicle in the photo at left is again seen here from the front, revealing the clean front plate of its superstructure. The vehicle retains the older type of cast driver's hood.

This prototype of a mortar carrier with very clean lines exists only as a mock-up. The new upper part of the superstructure was made of plywood.

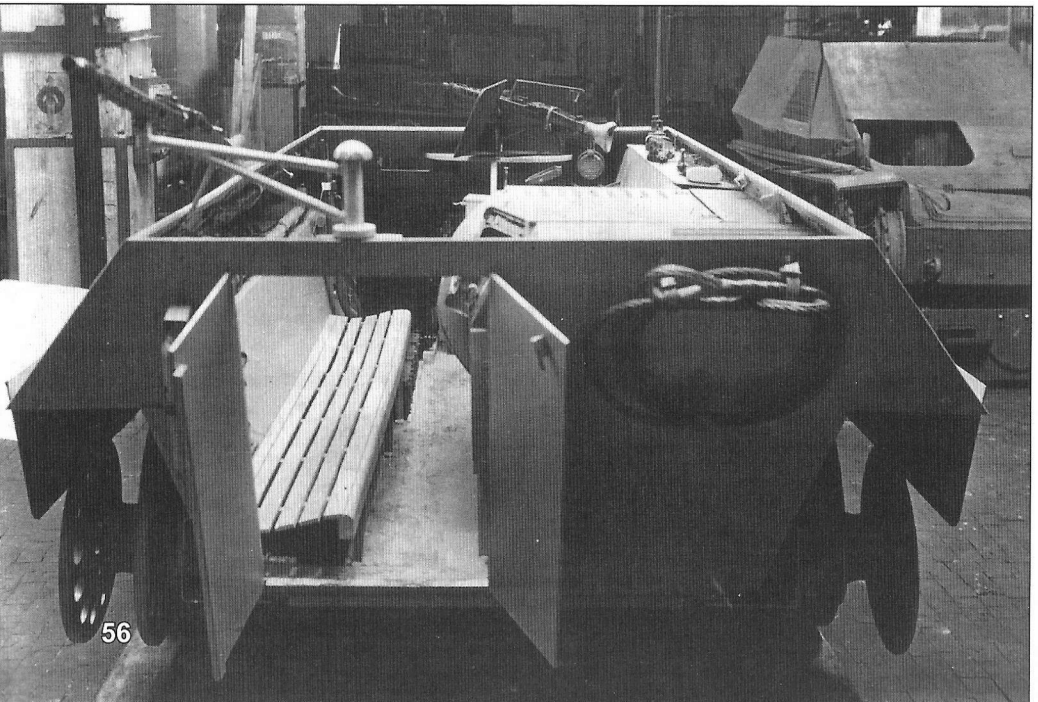
The large, two-part rear door is visible in this rear view of the mortar carrier. All the planes on the superstructure are angled for better ballistic protection.





One of the prototypes of the Vollkettenaufklärer 38(t) Kätzchen (kitten) is seen here. The Kätzchen was more an armored transporter than a reconnaissance vehicle. It was well armored, fast, and could carry eight men.

This rear view of the Kätzchen shows the placement of the Tatra Diesel engine on the right, the entrance door, two machine guns and the seat for the driver up front and a bench for the crew on the left.



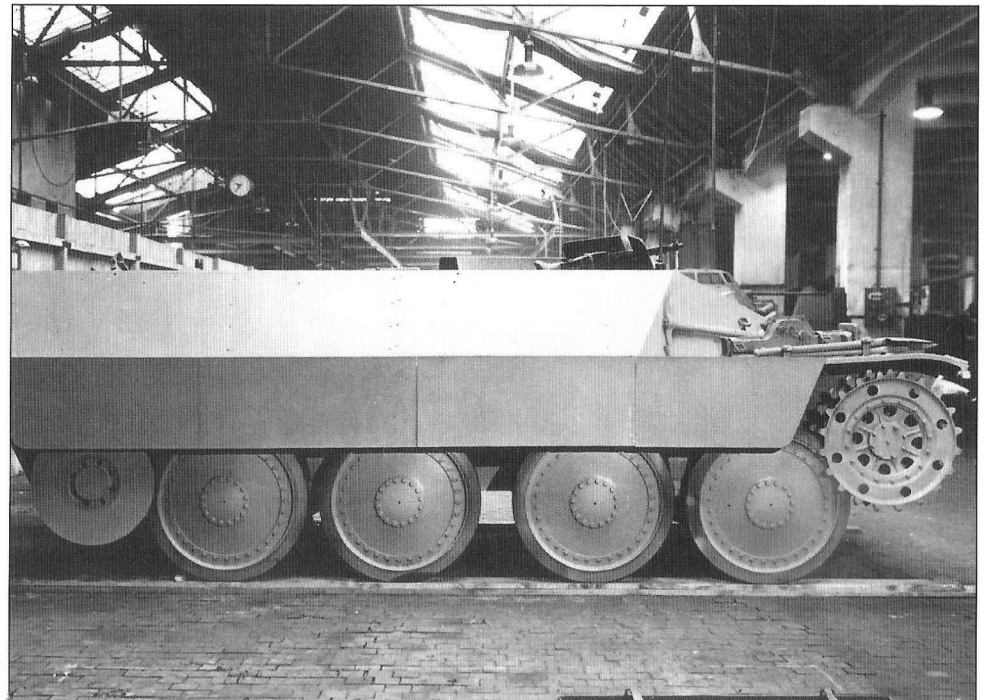
Vollketenaufklärer 38(t) "Kätzchen"

The Heereswaffenamt Wa.Prüf-6 tasked Auto-Union to develop a fast, well protected fully tracked reconnaissance vehicle with an open-top superstructure. The vehicle was to have the capacity of carrying six to eight men. Because Auto-Union's prototype had problems with its gearbox, and because in 1944 was decided to limit all new production to only two chassis – the Panther and Pz.Kpfw.38(t) – it was decided to task BMM to produce two prototypes.

The prototypes were based on the Pz.Kpfw.38(t) n.A. chassis. It was planned that one of them would use the PRAGA NR engine with an output of 280 h.p, the other the TATRA 12-cylinder air-cooled Diesel engine with an output of 220 h.p. at 2,600 r.p.m. This engine would gave the vehicle a top speed of 64km/hour, and endurance up to 600km. Their vehicles' armor was 50mm thick in front, 30mm on sides, and 20mm in the rear. Armament was two machine guns – positioned, as in the half-track carriers, one up front behind a protective shield, and the other in the rear on an antiaircraft mount.

The BMM was clearly a better vehicle, being better armored and faster than the Auto-Union vehicle. The use of a Diesel engine lowered the possibility of fire if the vehicle were hit. If manufactured in quantities, it would have been not only an excellent reconnaissance vehicle, but a good armored troop carrier as well. The vehicle never entered production, however, and the post-war fate of the two prototypes is not known.

A side view of the Kätzchen highlights its low silhouette and clean lines. The MG had a protective shield as used on the Sd.Kfz.251 half-tracked personnel carriers. The Kätzchen had a maximum speed of 53 miles/hour, more than twice the speed of the Sd.Kfz.251, and much better cross-country performance.



Technical Data of AFVs Based on Pz.Kpfw.38(t) Chassis

Army designation	SdKfz139	SdKfz138	SdKfz138M	SdKfz138/1	SdKfz138/1M	SdKfz140	SdKfz140/1
Specification	tank hunter	tank hunter	tank hunter	sp gun	sp gun	AA tank	recce tank
Ready weight (kg)	10,670	10,800	10,150	10,800	12,000	9,700	9,500
Length (mm)	5,850	5,770	5,020	4,840	4,950	4,610	4,650
Width (mm)	2,160	2,160	2,150	2,260	2,470	2,250	2,120
Height (mm)	2,500	2,510	2,350	2,150	2,470	2,250	2,120
Crew	4	4	4	5	5	5	4
Armor (mm)	8-50	8-50	8-15	8-50	8-15	8-15	8-50
Pressure (kg/cm2)	0.56	0.56	0.54	0.62	0.66	0.52	0.51
Main gun	7.62cm	7.5cm	7.5cm	15cm	15cm	2cm	2cm
PaP	36(r)	PaK 40/3	PaK 40/3	sIG 33	sIG 33/2	Flak 38	KwK 38
Machine gun	MG 37(t)	MG 37(t)	MG 42	MG 34	MG 42	MG 42	
Ammunition	30/1200	38/600	27/1500	16/384	18/500	1,040	300/1500
Engine type	PRAGA	ACPRAGA	ACPRAGA	ACPRAGA	ACPRAGA	ACPRAGA	ACPRAGA AE
Output (h.p.)	150	150	150	150	150	150	160
Max.speed (km/hr)	47	47	47	47	42	48	58
Obstacles (cm)							
- step	80	80	80	80	80	80	80
- ditch	210	210	210	210	210	210	210
- wading	90	90	90	90	90	90	90

Combat Utilization of the Tank Hunters

The German Panzer Divisions were the strike force of the Wehrmacht. In attacks they were employed where the enemy forces were the strongest; in defense they acted like "fire brigades." Aside from their tank units, they were well provided with antitank artillery. During the whole war these divisions had an organic antitank battalion. It was originally equipped with towed antitank guns, but starting in 1942, this battalion was transformed into a tank hunters battalion (Panzerjäger Abteilung – PA) with three companies. Two of these companies were equipped with self-propelled antitank guns and one with towed guns. In some battalions all three were companies equipped with tank hunters, but more often chronic shortages meant that only one company had them.

There were two types of Panzerjäger Abteilung, The first type was an independent unit, subordinate to higher headquarters, which would assign it to individual divisions or even smaller units, according to their immediate needs. The units were assigned three-digit numbers, and were raised side-by-side with the divisional organic antitank battalions, carrying one- or two-digit numbers. The two types were raised according to different organizational tables. Each independent battalion had its headquarters and three companies, each with a headquarters with three tank hunters, and three platoons with three vehicles each, for a total of 36 tank hunters. The battalion also had scores of motorcycles, cars and trucks, like other fully motorized units. The divisional battalions also had its headquarters and three companies. The first and second mechanized companies each had 14 tank hunters, and the third motorized company had 12 towed antitank guns. The divisional antitank battalions were about 500 men strong.

Side-by-side with the army's Panzer divisions, the tank hunters were also assigned to corresponding Waffen SS divisions. Once the output of tank hunters increased, and their utility in both attack and defense was recognized, many infantry divisions also received them. Before the end of the war, the MARDER III tank hunters appeared in mountain divisions (Gebirgs-Divisionen), rifleman divisions (Jäger-Divisionen), and home guard

divisions (Volkssturm-Divisionen or Volksgrenadier-Divisionen).

German sources claim that at the beginning of 1943 the Wehrmacht had 1,124 tank hunters of all types. In 1944 the number was 1,569 and at the beginning of 1945 736. These numbers correspond with the data on combat losses/replacements, which were 127/1,123 in 1943, 925/1,375 in 1944 and 1,155/441 in 1945. The tank hunters on the Pz.Kpfw.38(t) chassis probably represented between 60% and 70% of the total, due to the high numbers produced.

The combat tactics of the lightly armored tank hunters had to keep in mind that they were mechanized antitank artillery. They could not replace tanks either in attack or in defense, as could the comparatively armed but much better armored Sturmgeschütze.

But they represented a great improvement over the towed guns, which were almost as mobile as the tank hunters, except that their crews were exposed to infantry weapons and splinters, and the gun had to be emplaced before use, whereupon it became immobile. On the other hand, the gun on a mobile chassis was more mobile, was always ready to fire, and its crews were at least partially protected against infantry arms.

The tank hunter's credo was to strike first and disengage fast. The German tank hunter units very quickly mastered tactics that utilized their advantages and almost nullified their disadvantages. A combination of good camouflage, accurate fire, and fast movement made the tank hunters very dangerous adversaries and a nightmare for every tank commander. If used properly, their losses were not very high, especially when compared to the losses they caused the enemy. In the last phases of the war, when Germany had a great shortage of tanks, the tank hunters had to fight in place of tanks or assault guns. This naturally caused much higher losses. Aircraft were also a very dangerous adversary of the tank hunters. Their fighting compartments were open at the top and rear, and fire coming from these directions had a devastating effect on their crews.

Self-Propelled Artillery In Combat

In 1943 a new self-propelled gun, the Sd.Kfz.138/1, was introduced. It was much more modern than the earlier models, and 200 of these new vehicles were delivered. The organizational tables of the Panzer and Panzergrenadier Divisions specified 12 these self-propelled guns in each division. These were not part of the divisional artillery regiment, but were subordinated directly to the Panzer Regiments as their support weapons. Both regiments had six these self-propelled guns in their 9th companies. The first 200 vehicles were supplied to the 1st, 2nd, 4th, 5th, 16th, 17th, 24th, and 26th Panzer Divisions, the 3rd and 29th Panzergrenadier Divisions of the Wehrmacht, Panzergrenadier Divisions Großdeutschland and Feldherrnhalle, and Waffen SS Panzer Divisions Adolf Hitler, Das Reich and Totenkopf.

The listed divisions fought mainly on the Eastern front, some also in Italy. The self-propelled guns supported their infantry well, but heavy fighting led to many losses. BMM manufactured a small lot of 10 vehicles in November 1943, but that could not fully replace the losses. At that time, BMM already had a prototype of an improved version built on the Ausf.M chassis, and from December 1943 to May 1944 made 118 of the Sd.Kfz.138/1M vehicles, followed immediately another 74 vehicles, for a total 403 delivered GRILLEs of both models.

Combat experience with the GRILLEs has shown that the batteries in firing position did not carry a sufficient supply of ammunition. As supply by trucks was considered too dangerous, it was decided to provide each three-gun battery with one ammunition carrier. It has not been possible to ascertain which units obtained the ammunition supply vehicles, or if any were converted in the field to the gun-carrying vehicle. German sources list 173 GRILLEs in active service in March 1945, but they do not list the self-propelled guns and ammunition carriers separately.

Flakpanzer 38(t) - Sd.Kfz.140 In Combat

Delivery of the Flakpanzer 38(t)s began in November 1943. In December one vehicle was inspected by Adolf Hitler, who decreed that the elite Panzer Divisions should be equipped as soon as possible. They were put into newly formed Panzer-Flugabwehr Züge (antiaircraft tank platoons), starting in February 1944. Each platoon had three groups of four vehicles, used mostly for protecting divisional and regimental headquarters.

Most Flakpanzer 38(t) s went to France to the newly equipped 2nd Panzer, Panzer Lehr, and 21st Panzer Divisions, and to elite Waffen SS units, such as the 1st SS Panzer Division Leibstandarte Adolf Hitler, 2nd SS Panzer Division Das Reich, 12th SS Panzer Division Hitlerjugend and 17th SS Panzer-Grenadier Division Götz von Berlichingen. SS divisions on the Eastern front – the 9th SS Panzer Division Hohenstaufen and 10th SS Panzer Division Frunsberg – also obtained one platoon of the Sd.Kfz.140 vehicles each. In July 1944 both these divisions were transferred to France, where neither of them showed the Sd.Kfz.140 vehicles on their rosters. In the spring of 1944, four divisions in Italy were also equipped with the Flakpanzer 38(t)s. These were the 26th Panzer, 29th and 90th Panzer-Grenadier, and the Luftwaffe's Herman Göring Divisions.

The hard work for the Flakpanzer 38(t) began on 6 June 1944 when the Allies invaded at Normandy. During the next two months they were in almost continuous action, trying to fight off the massive attacks of the Allied air support fighter-bombers. By the end of July 1944, the engaged divisions reported a complete loss of 12 Flakpanzers, which had to be considered a success, considering the severity of the fighting.

In the first half of 1944, the Italian front was also very active. The Allies had full air superiority, and the Flakpanzer 38(t)s of the four divisions had their hands full. Their losses mounted accordingly, but there were no replacements.

In late 1944 Adolf Hitler decreed that henceforward all German tracked armored vehicles will be based only on two chassis: Pz.Kpfw.38(t) for the light ones, and Panther for the heavy ones. This led to development of the above prototypes, and also later the Waffenträgers. The armored infantry or ammunition carrier could have replaced the Sd.Kfz.251 half-tracked carriers, but the Kätzchen was a much better design, lower, with its engine in the back and a more conveniently arranged interior. In the end it was decided to keep the Sd.Kfz.251 in production and concentrate the use of the Pz.Kpfw.38(t) chassis for tank hunters and assault guns.

Tank Hunters Assigned to Panzerjager Abteilugen in 1942-1944

PJA no.	Assigned to division	Vehicles total	Time and place of service
559	independent	21	
616	independent	36	
731	independent	68	
744	independent	9	
37	1st Panzer Division	49	1943 Greece
49	4th Panzer Division	7	Soviet Union
53	5th Panzer Division	16	Soviet Union
41	6th Panzer Division	7	Soviet Union
42	7th Panzer Division	34	Soviet Union
43	8th Panzer Division	26	Soviet Union
61	11th Panzer Division	12	Soviet Union, from 1944 France
33	15th Panzer Division	4	North Africa
27	17th Panzer Division	4	Soviet Union
19	19th Panzer Division	27	Soviet Union
92	20th Panzer Division	15	Soviet Union
39	21st Panzer Division	34	North Africa
1	1st SS Panzer Division	20	Soviet Union 1942, Italy 194
	Leibstandarte Adolf Hitler		France 1944
2	2nd SS Panzer Division Das Reich	12	Soviet Union, France 1944
15	15th Infantry Division	12	Soviet Union
16	16th Infantry Division	3	France
31	31st Infantry Division	3	Soviet Union
34	34th Infantry Division	13	Soviet Union
349	349th Infantry Division	15	Soviet Union, France 1944
3	3rd Panzergrenadier Division	12	Italy
10	10th Panzergrenadier Division	28	Soviet Union
228	16th Panzergrenadier Division	12	Soviet Union
8	20th Panzergrenadier Division	38	Soviet Union
29	29th Panzergrenadier Division	12	Sicily, Anzio
60	60th Panzergrenadier Division	12	Soviet Union
	1st Ski Jäger Division	18	Soviet Union
53	5th Jäger Division	6	Soviet Union
16	16th Volksgrenadier Divison	6	France

Both Sd.Kfz.138 and 139 are counted

The new camouflage was introduced in 1943. The base Dunkelgelb was brownish yellow, and was usually complemented with Olivgrün (like on this GRILLE) or Rotbraun in irregular patches, which were usually applied in the field by the crew themselves.

The "ambush" scheme was introduced later in the war, and was applied in the factories during production. Although it was supposed to be standardized, both BMM and Škoda used slightly different pattern on their Hetzers.

Camouflage and Markings

The camouflage colors of the German armed forces were developed and registered by the Reichsausschuß für Lieferbedingungen und Gütesicherung ("The Reich Commission for Delivery Terms and Quality Assurance," abbreviated "RAL" in German). The Commission assigned its RAL number to every color accepted into its formulary.

In 1937 the Wehrmacht initially replaced the three-tone camouflage paint scheme (Buntfarbenanstricht) introduced in1933 with a new two-tone paint scheme that consisted of a dark gray (Feldgrau – RAL 6006) base color and dark brown (Dunkelbraun – RAL 7017) patches over about one third of the vehicle's surface. In 1939, at the beginning of the Polish Campaign, most of the Army vehicles were painted dark gray overall. On open-top vehicles, the insides were also painted dark gray.

For service in Africa, the armored vehicles were originally shipped in dark gray camouflage, as the Army was not prepared for the campaign there. The crews had to improvise, using mud and sand paste, which was quite effective, but did not last long under field conditions. The Army reacted quickly, and in March 1941 introduced two new "Afrika" colors, yellow-brown Gelbbraun RAL 8000, and gray-green Graugrün RAL 7008. These colors were actually used by the Reich's railways, and were therefore not developed specifically for the desert use. The Deutsches Afrikakorps (DAK) also used captured British and Italian camouflage paints, due to the shortages of the prescribed paints, and so few of its vehicles carried the specified camouflage. In March 1942, two new colors were introduced, brown (Braun – RAL 8020) and gray (Grau – RAL 7027).

During the first two years of the Russian campaign, most German vehicles were camouflaged in dark gray overall, with liberal application of dust and mud in the summer and a whitewash in the winter. Dust especially covered the dark gray paint very effectively and caused the vehicles to blend with the roads they were using. On the other hand, the gray paint was very conspicuous on green background (meadows, steppes). It was clear that a profound change in the camouflaging system was necessary. It came in February 1943, when all the old systems and paints were discontinued and were replaced by Dunkelgelb RAL 7028. This color was more light brown than yellow, and for camouflaging purposes it was complemented by two additional colors: reddish brown (Rotbraun – RAL 8017) and olive green (Olivgrün – RAL 6003). Both these colors were applied in the field in varying patterns, depending on the season and type of terrain. They were supplied in the form of pastes, which could be diluted with water or gasoline for spraying or brushing. Use of water was naturally recommended in order to save precious gasoline. Even when applied from water, the pastes became water insoluble after drying. The hue of the colors changed with application, for example the red brown was reddish when applied lightly; when applied heavily, it became dark chocolate brown. During winter months, the vehicles were white-washed overall. Towards the end of the war, a new so called "ambush scheme" was introduced. In consisted of the base Dunkelgelb paint, covered with irregular patches of Rotbraun and Olivgrün. On these two darker colors were small yellow triangles, and on the yellow the same sort of triangles, but in green.

The choice of the camouflage colors and patterns was left to unit commanders, but

individual crews were usually left free to show their "artistic abilities." Thus, even vehicles of one unit very seldom carried identical or even similar camouflage patterns.

All German armored vehicles carried the national emblem, the so called Balkenkreuz. The shape and size of those crosses varied with time. During the Polish campaign, the crosses were solid white, and fairly oversized. For the French campaign, the crosses were black, with heavy white borders. Later in the war the black center part became thicker and the white border thinner. In some instances (dark base camouflage), only the white outer borders were used. The crosses were usually carried on the sides of the superstructure, and on the back. Only seldom were they used on the front of the vehicle. They also carried the so-called call numbers, denoting the position of a vehicle in its unit.

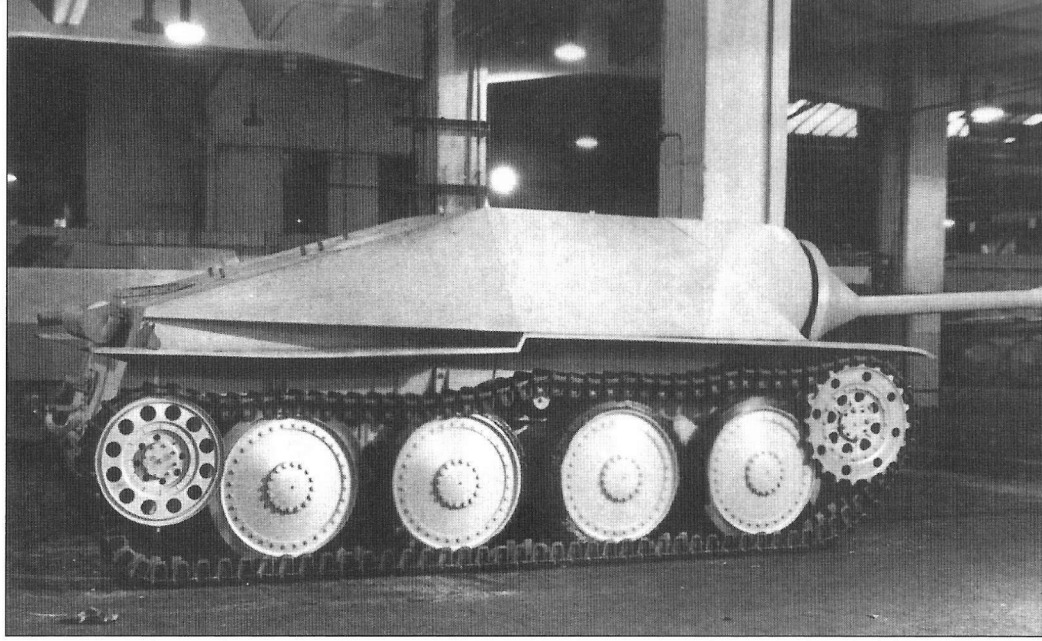
All Wehrmacht vehicles also carried front and rear tactical signs in yellow, white, or black, depending on the background color. Those signs sometimes designated that the vehicle belonged to an Army Group, such as the large G (Guderian) and K (Kleist), carried during the French campaign in 1940, or the special palm tree sign of the Afrikakorps. All the vehicles carried the sign of the division to which they belonged and an organizational symbol, specifying the type of vehicle and its intended use (tank, tank hunter, self-propelled artillery, etc.) Finally, for aerial recognition, crews often spread German red flags with the swastika, spread across the engine cover or on the front of their vehicles.

Jagdpanzer 38(t) mit 7.5 PaK 39 L/48 Hetzer - Sd. Kfz.138/2

Due to the changed situation on the fronts in 1943, Germany was forced onto the defenseive. As the infantry divisions were more urgently demanding tank hunters to provide protection against enemy tanks, these vehicles and various self-propelled guns were produced in larger numbers than medium and heavy tanks from 1943 on.

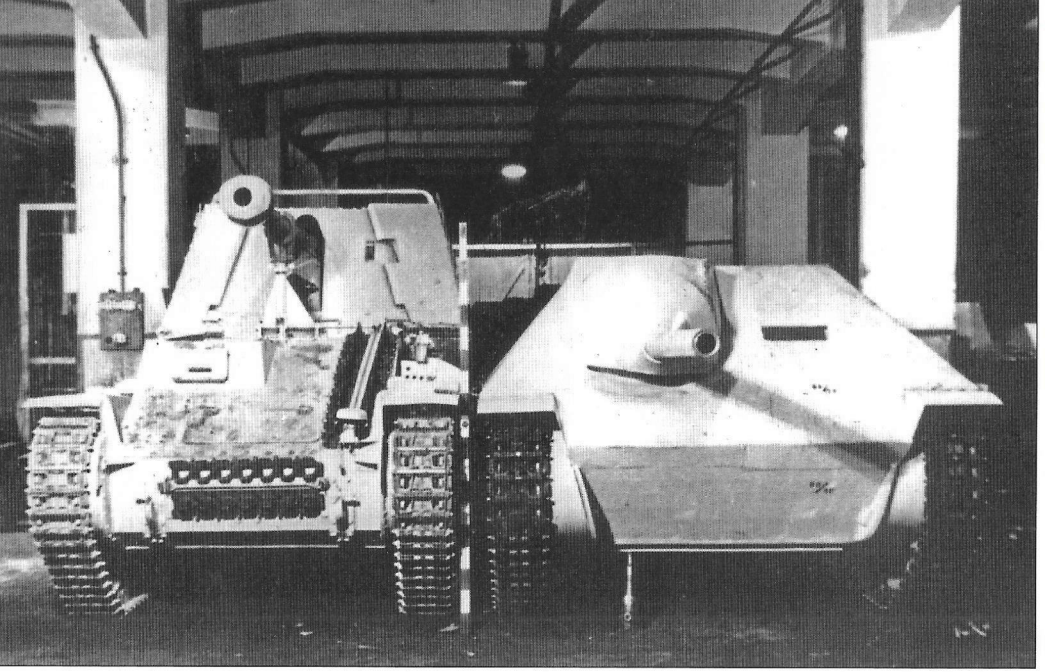
In November 1943, Allies bombed the main producer of the StuG III assault guns – Altmarkische Kettenwerke (Alkett) – in Berlin-Borsigwalde and heavily damaged its factory. The Wehrmacht had to find a replacement manufacturer, and in December 1943 chose BMM in Prague. BMM was at that time ending its production of light tank hunters and self-propelled guns, and also was located in the Protectorate which was so far safe from the bombing raids. On the other hand, it had smaller assembly halls and obsolete equipment, and could not switch production from light armored vehicles to heavy ones.

Nevertheless, the design bureau of BMM was working on the design of a new light tank hunter with a fully enclosed superstructure, and this presented a way out of the present dilemma. Colonel Hans-Joachim Schaede from the Waffenamt placed an order for a 13-ton light assault gun with the BMM representatives on 18 December 1943. Because it was necessary to start production as soon as possible, the order specified the use of already manufactured components of the light tank Pz.Kpfw.38(t). Its armament was also specified: 7.5cm antitank gun PaK 39 L/48. The vehicle's speed was planned to be between 50km and 60km/hour.



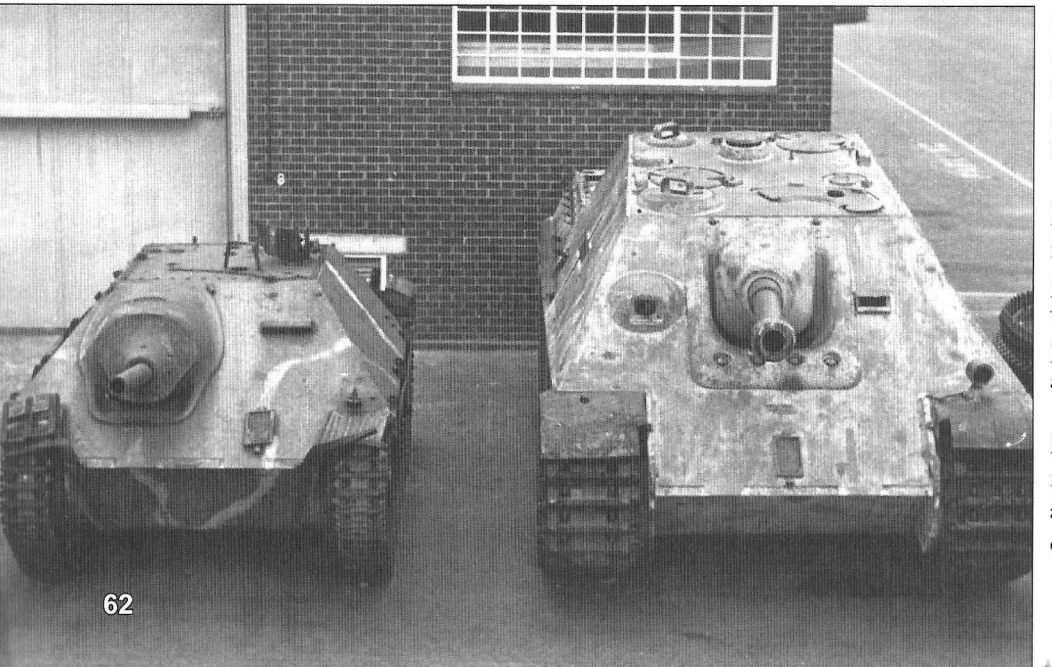
BMM shows off the mock-up of the proposed Panzerjäger 38(t) in January 1944. On a modified chassis of the Pz.Kpfw.38(t) is a superstructure made of plywood. The gun is the 7.5cm StuG 40, used in assault guns.

A photograph documents trial runs on the BMM tank proving grounds, performed with both Czech and German personnel. The antiaircraft tank Sd.Kfz.140 is being used as a supporting vehicle and also carried the photographers covering the tests.



A comparison between the MARDER III Ausf.M and the Hetzer shows its wider stance and much lower height. The Hetzer also had a much better armor protection and was totally enclosed.

Two Jagdpanzers on the two approved chassis for further production, the Hetzer and the Jagdpanther, can be compared as they sit next to each other. Although the Jagdpanther had a much heavier armor and carried the 8.8cm PaK 43/3, at 46 tons it was as fast and as agile as the 16-ton Hetzer.



The drawings of the final version of the vehicle were finished on 8 January 1944. Its body was welded from armored plates of various thicknesses – 60mm on the front plate, 20mm on the sides and rear, 8mm on top and 10mm on the bottom. The shape of the hull was inspired by the Jagdpanzer IV, whose manufacturing was just beginning with the Vomag Company in Plauen. The armament was also identical – PaK 39, lafetted in a Cardan joint behind a gun shield in the shape of swine's snout. The planned power plant was the improved PRAGA AE 2800 engine, concurrently tested on the reconnaissance tank Sd.Kfz.140/1. Preliminary design work showed that the planned weight of 13 tons was impossible to attain, and that the fully loaded vehicle would weigh 16 tons, an increase that adversely affected speed and mobility. Also, the mounting of the heavy gun on the right side of the front plate put an uneven load on the running gear, making driving the vehicle more problematic and increasing wear onf some chassis parts.

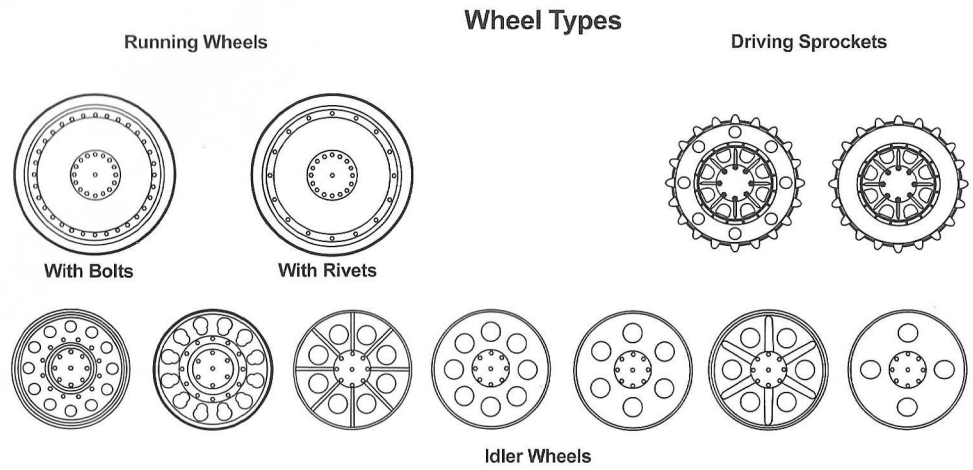
Despite the shortcomings, already known at the design phase, the vehicle was accepted, because the whole program had a temporary character. The final vehicle was to be equipped with an air-cooled TATRA Diesel engine, to ride on an improved, well balanced chassis, and to carry a rigidly mounted gun without recoil mechanism. Because this improved 38(d) vehicle only got to prototype stage before the end of the war, the "provisional" vehicle had to gain its laurels on the battlefield, its original design faults notwithstanding. It was unofficially named HETZER (hunting dog, meant for the chase) by the soldiers. The name was sanctioned by Adolf Hitler on 4 December 1944.

As BMM lacked the capacity to produce the 1,000 vehicles per month that the Germans demanded, Škoda Werke was ordered to join in the production work. According to plans, BMM was to deliver its first vehicles in March 1944 and Škoda in July 1944. By December 1944, BMM was to produce 400 vehicles, and Škoda 300. The full production of 500 vehicles per month for each company was planned for March 1945.

The shape and the total arrangement of the hull remained unchanged throughout the whole production run. The Jagdpanzer 38(t) took over the engine and steering mechanism from the other armored vehicles built on the Pz.Kpfw.38(t) chassis, albeit technologically improved. The chassis had wider track spacing – 2,123mm against the original 1,780mm. The original tracks were used, but the running wheels had a larger, 825mm diameter, and were taken from the reconnaissance tanks Pz.Kpfw.38(t) n.A.

The first variant of these tank hunters was characterized by a massive armored cowl and heavy cast part of the lafette. These parts went through a lightening process practically from the start of the production, because the vehicle was nose-heavy. The driver had two periscopes, one turned to the front and one observing the terrain in the near front of the vehicle. Originally, they were covered with a cast steel cover, but since they actually caught projectiles, they were later replaced with light tin covers that procteced the periscopes from sun and rain. The muffler also went though several changes, as did the idler wheels.

The engine cover was also changed. The commander's hatch got a new part, and in the lower covers were added small hatches with filling nozzles for fuel tanks and the radiator. Inside the engine's compartment some components of the individual aggregates and their placement were also changed. Small improvements were realized in the crew's compartment, such as additional padding, driver's hand holds, etc.

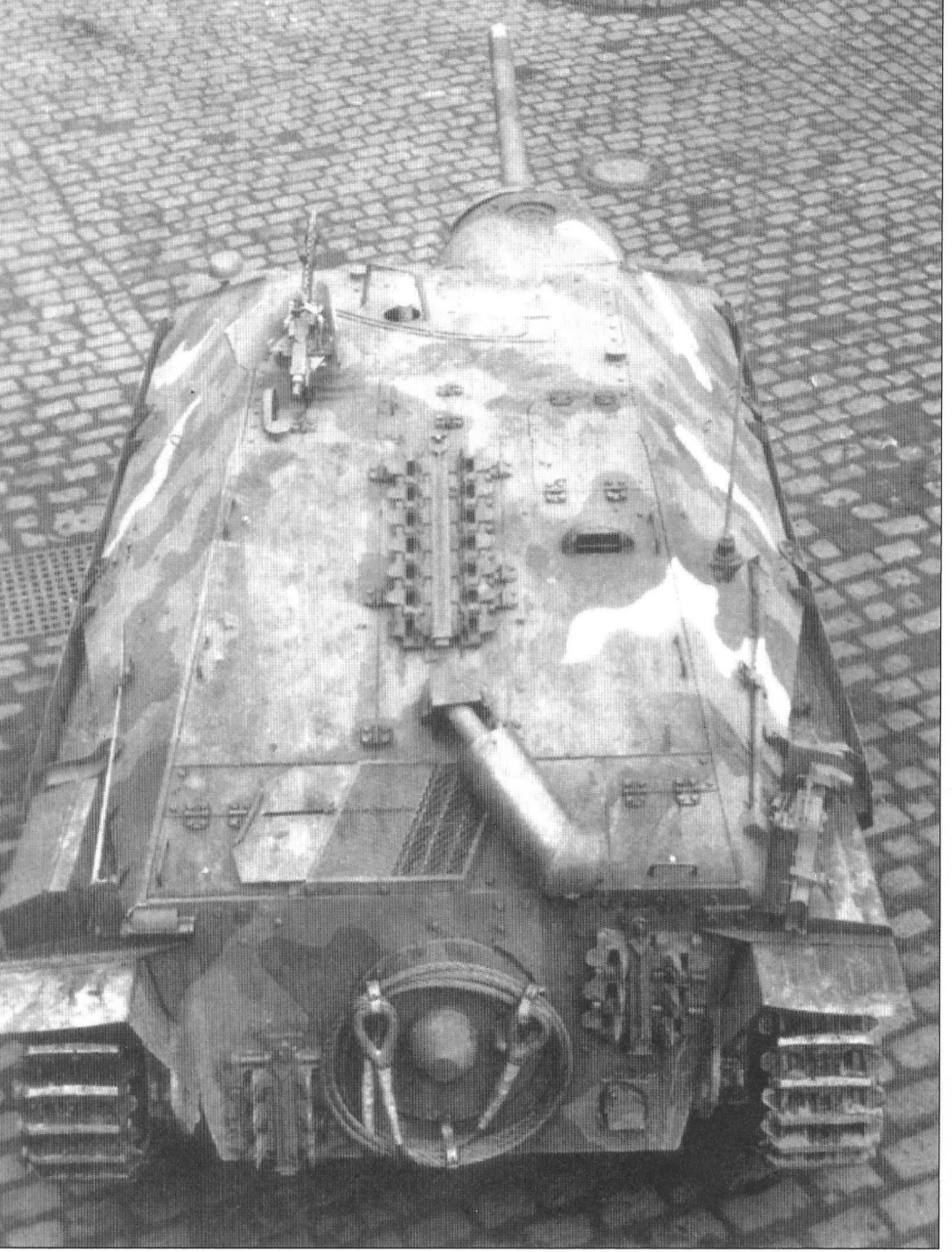


Hetzer's wheels were modified several times. On the running wheels, the armored covers were originally screwed in, on later models they were bolted. The driving wheels went from 12 teeth on the driving shaft and 88 inner teeth on the driving sprocket to 10:80 in January 1945. The idler wheels went through six changes to simplify their production.

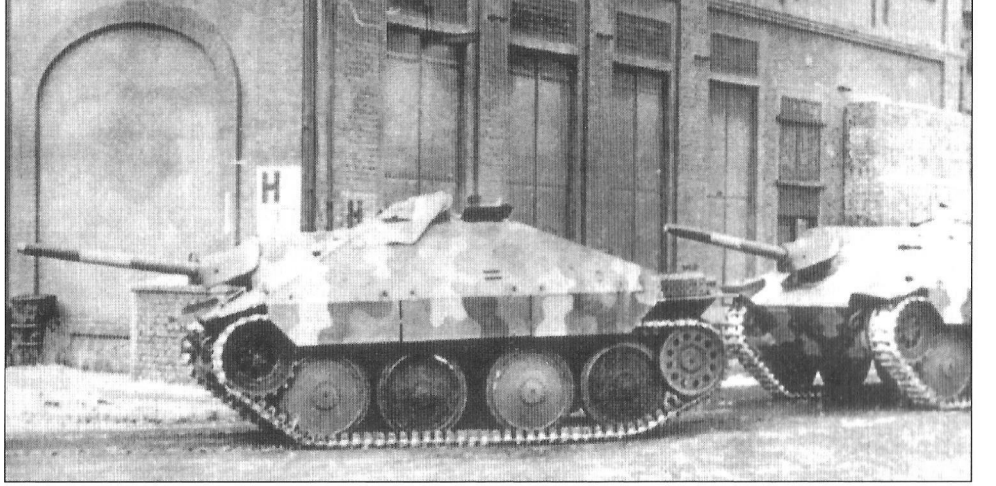
On a production line of the Hetzers in BMM, the hulls are moved from rear to front, where the guns are finally fitted and the finished Hetzer turns and leaves. The guns with their mantlets are on the right in this photo taken in June 1944.

A pair of brand-new Hetzers are seen in the BMM works, Prague. Manufactured from April 1944, the Hetzer formed towards the end of the war the staple of German anti-tank formations. These two vehicles represented the early production model of the Hetzer, characterized by the narrow mantlet and early patter rear idler.

The same vehicles are viewed here from the rear. On the right vehicle, the commander's hatch is closed and the half-circle stop is clearly visible. On the vehicle to the left, the hatch is open and resting on this stop which kept it in the horizontal position. Note the horizontal mufflers - later vehicles had vertical mufflers to avoid trapping grenades which might land on the engine deck.

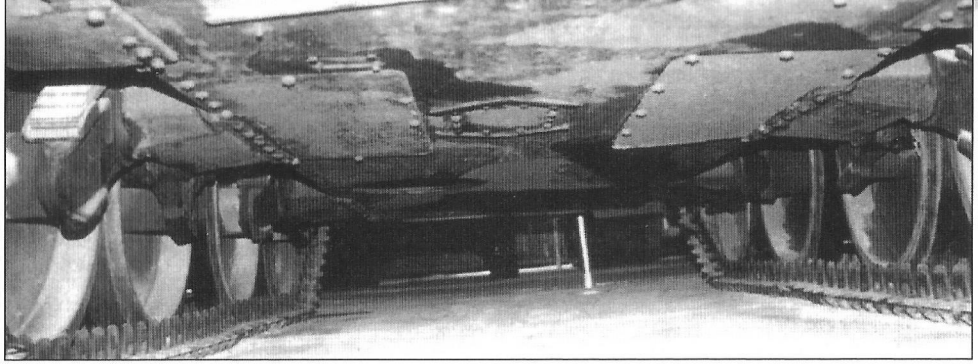


From the front on the roof of this Hetzer seen from overhead are the aiming scope of the gun, the remotely controlled machine gun, the left periscope right behind it, the radio operator's hatch on the left and the commander's hatch with the rear periscope on the right, and two large and two small engine access hatches.



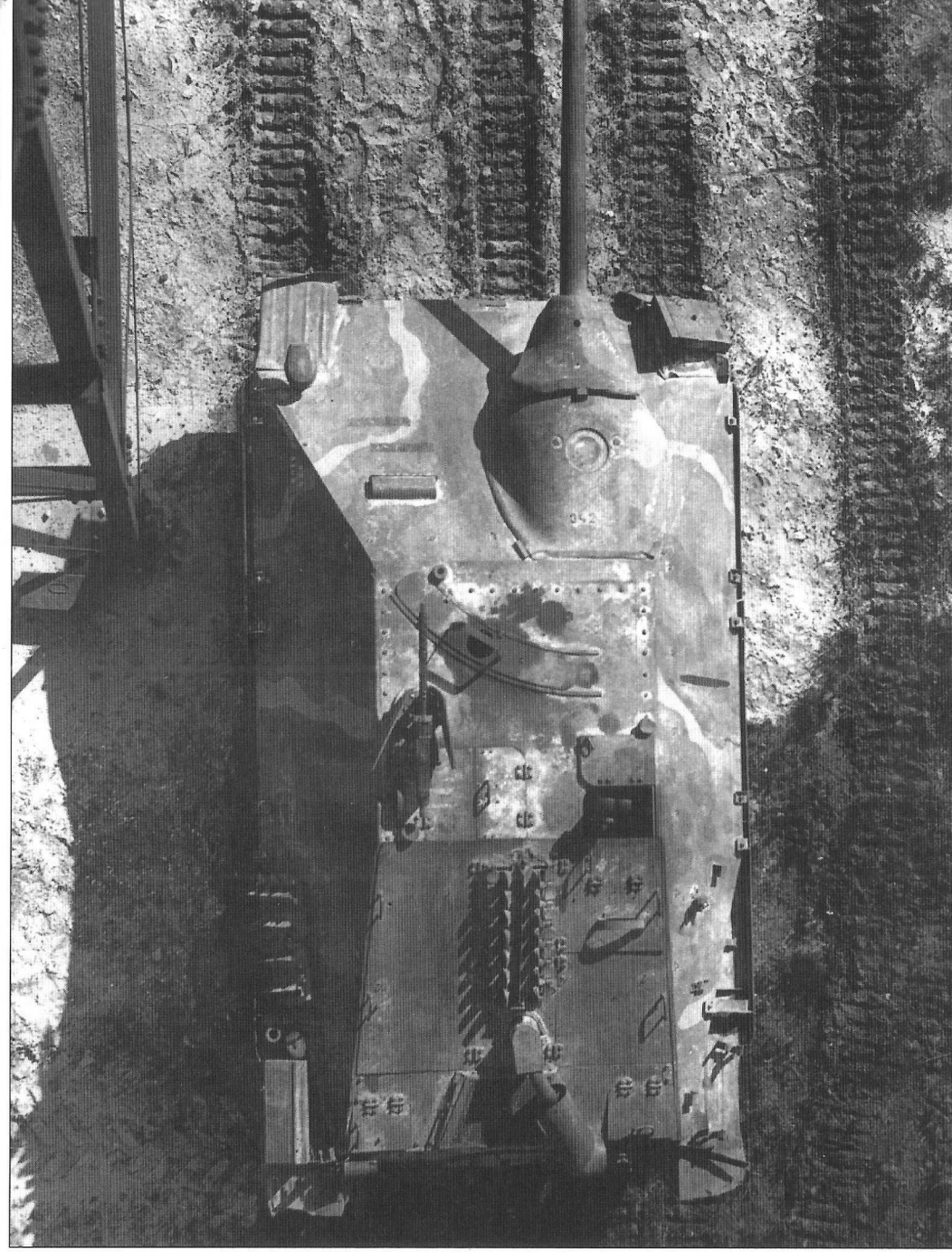
During October 1944 the changes ordered during the summer began appearing on the production vehicles – the riveted road wheels and the light covers of the driver's periscopes. The old idler wheels were still widely used at this time.

This Hetzer from the autumn 1944 production features the new simpler Saukopfblende. On the right fender it carries the wooden support for the jack, on the left the NOTEK light. The vehicle is wearing a typical camouflage applied in the factory before the introduction of the Ambush Scheme in early 1945.

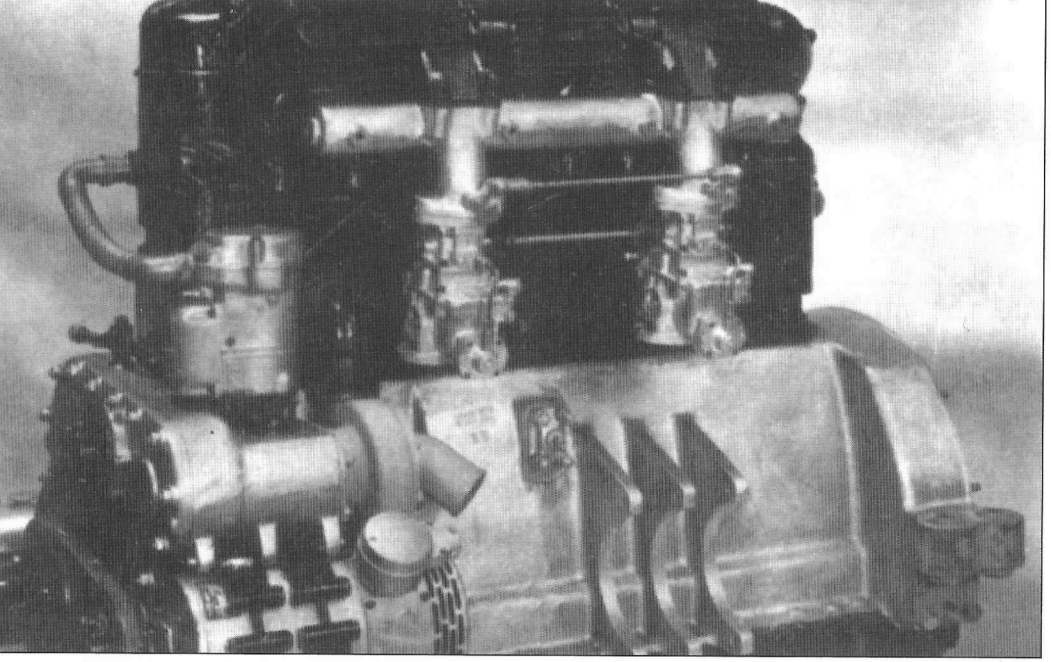


In this view on the bottom of Hetzer's hull, up front are the two metal plates, lightly attached under the fuel tanks. In case of a hit, the tanks would blow downwards, and not into the fighting compartment. This feature was taken over from the Pz.Kpfw.38(t) design, and proved important in combat to lower casualties due to gasoline fire. This escape hatch was very small and would not accommodate heavier persons. Generally even the top hatches were quite narrow, and would slow the escape of the four-men crew. The hatches were also very thin, and did not close tightly, which allowed rain water to penetrate inside the vehicle.

A side-view of the fully equipped late production Hetzer illustrates the new simplified idler wheels, late type of Saukopfblende and the light tin cover of driver's periscopes. On top is the remotely traversed machine gun with its armored shield. The three-tone camouflage was applied in the factory, national insignia and call numbers were added by the units after delivery. Through the commander's hatch protrudes his artillery observation scope. The commander's position behind the gun was very cramped, and when the gun fired, the recoil stopped close to his knees. He had a rear periscope, which was very difficult to use, and no periscope to the right, because there was no room on that side behind the gun.

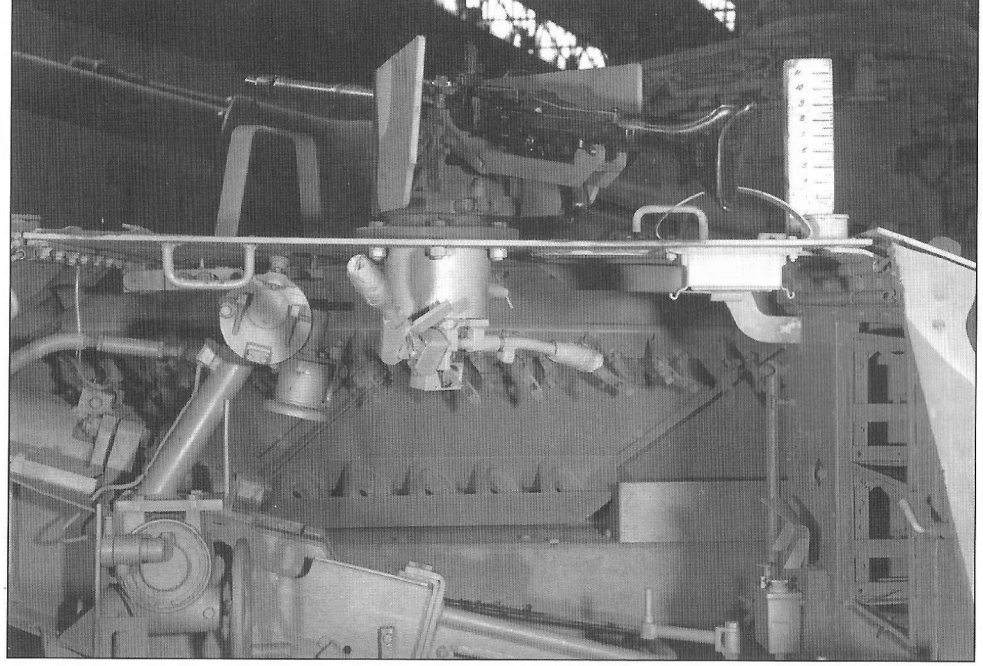


The NOTEK light is on the left fender, jack support on the right in this overhead view of the late production Hetzer in three-tone camouflage. The curved sliding cover on the top of the superstructure allowed the spotting scope to follow the gun during its traverse. There is no periscope on the right - the Hetzer was blind from this side.



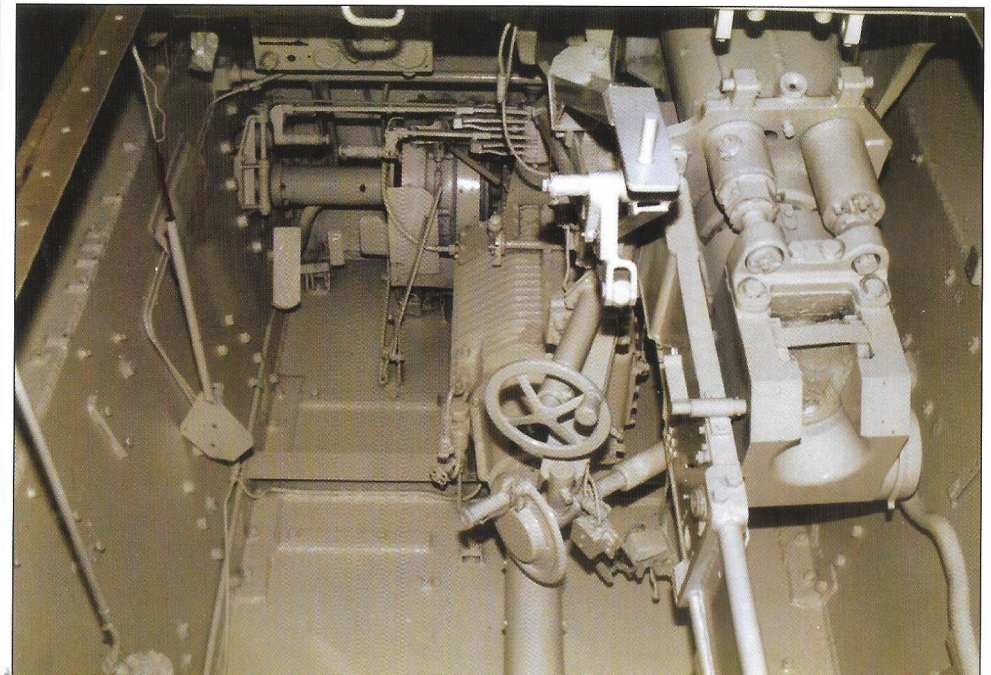
Hetzer's engine, gasoline six-cylinder PRAGA AE was an improved version of the Praga AC engine, used on the Marder III and Grille vehicles. It worked at 2,500 r.p.m. Its block was made from cast iron, the pistons from aluminum. Its output was 160 h.p.

The intake air was brought in through the opening in the side of the hull above the horizontal armor plate. A wire mesh on the intake opening prevented ingress of larger contaminants. A double air filter with an oil insert and a removal of the trapped dust protected the engine.



On the top in this side view of the Hetzer's interior is the remotely controlled machine gun, with its traverse control and aiming periscope. In the rear is the gun's breach and behind it holders for gun's ammunition. Note how thin the top plate is.

The breach of the gun occupies more than half of the fighting compartment. On the left are the wheels for traverse and elevation. At left front are the clutches and the shafts going from the gearbox under the gun to the driving wheels, and driver's pedals and horizontal driving levers. No other inside equipment is installed. (Factory photo)

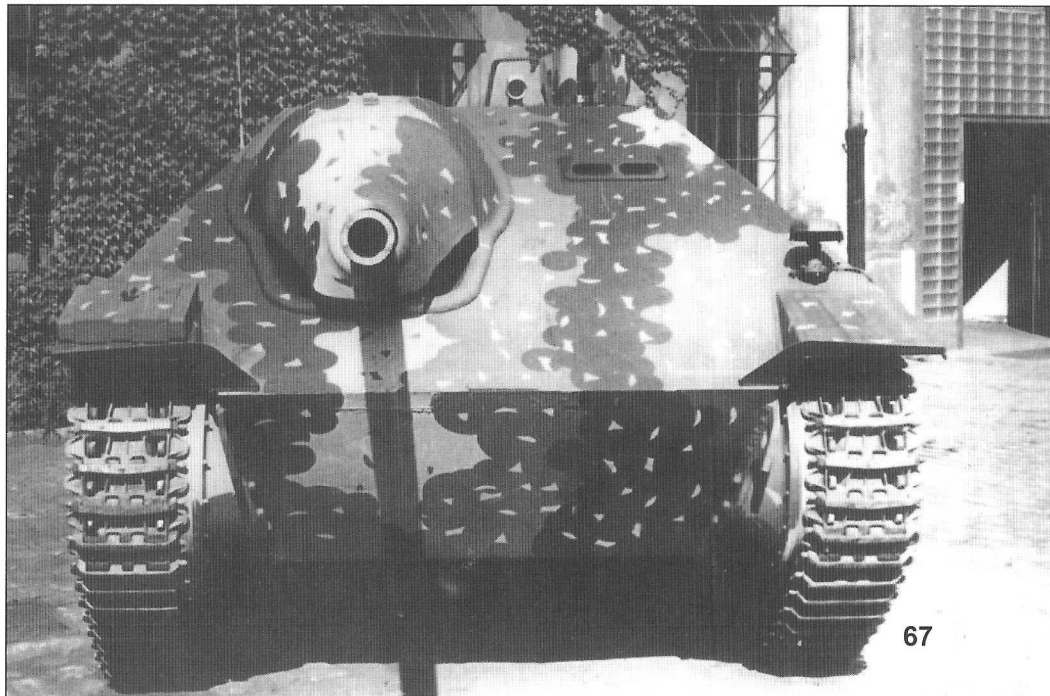


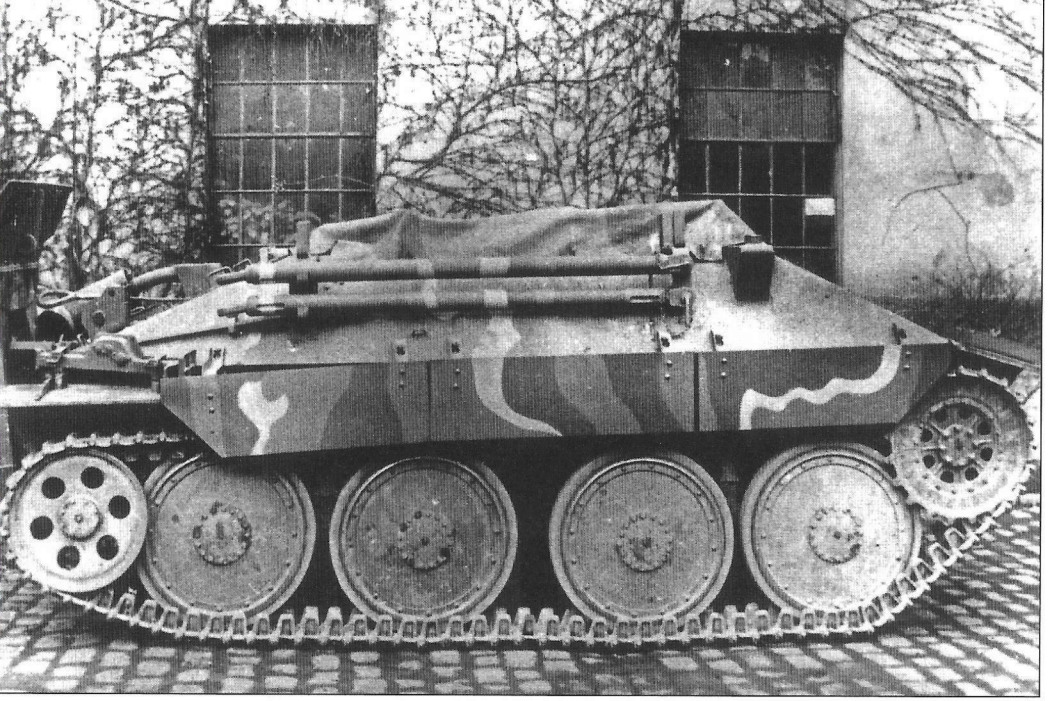
This late production Hetzer displays a three-tone "ambush" camouflage scheme. Both BMM and Škoda painted their vehicles this way in the factory in 1945. The wheels were always painted in single dark color, green or brown.

The side apron has been removed from this later Hetzer. On the side is the base for the aerial. Under the side plate is the intake of the engine's cooling air. The latest style idler wheel is seen here, and there are oil smudges on the running wheels.

Another type of a three-tone camouflage, has been applied by the manufacturers on this early production Hetzer with the "heavy" gun mantlet. The driver's periscopes are already protected against rain and sun by the thin metal cover.

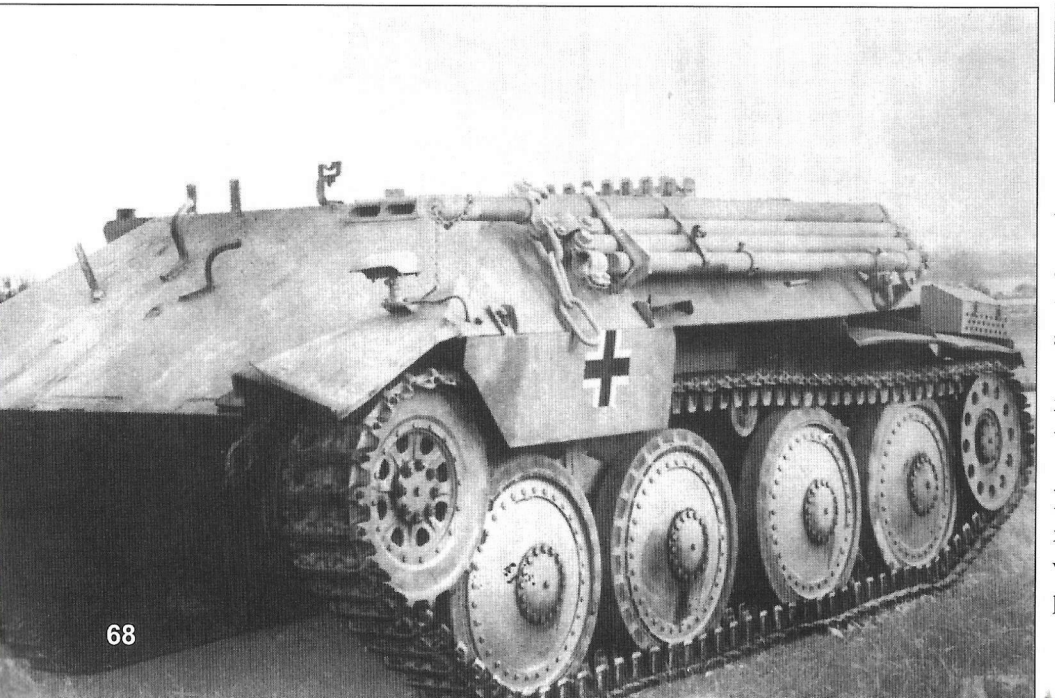
A finished Hetzer from a later series in the "ambush" camouflage scheme features the latest Saukopfblende, or "swine head" mantlet. The collar and the mantlet of the gun went through several lightening steps, as the vehicle was "heavy in the head."





This prototype of the Bergepanzer 38 is equipped with a massive rear spade, which was not used on the production vehicles. The lowered superstructure was open from above and carried the winch and two men crew. On the right side it carried two towing bars.

Although this is a late-production Bergepanzer 38, it still uses the first type of idler wheels. On the left side it carries a disassembled two-ton crane.



Jagdpanzer 38(t) Production 1944-1945

1944	BMM	Škoda	BMM/Berge	BMM/Starr
March	3	N/A	N/A	N/A
April	20	N/A	N/A	N/A
May	50	N/A	8	N/A
June	100	N/A	2	N/A
July	100	10	N/A	N/A
August	150	20	8	N/A
September	190	30	14	N/A
October	133	57	50	2
November	298	89	19	N/A
December	223	104	N/A	5
1944 Total	1,267	310	101	7
1945				
January	289	145	39	5
February	273	125	19	N/A
March	148	153	19	N/A
April	70	47	3	1
1945 Total	780	470	80	6
Total Production 1944-1945	2,047	780	181	13

Sunday, 25 March 1945, was a disastrous day for BMM. Three waves of more than 500 U.S. Army Air Force bombers blasted the northeastern area of Prague for about an hour and a half.

Flying very low, the attackers dropped 375 tons of bombs and the BMM factory was completely destroyed. Since the day was Sunday, casualties were fewer than if the raid had taken place during the work week, but as it was, 370 people were killed in the devastating attacks. From the ruins it was possible to save only 61 Hetzers.

BMM succeeded in organizing the completion of the 61 Hetzer vehicles in the Milovice military camp, located some 38km northeast of Prague, where final assembly was done up to the end of the war.

Later, high-flying USAAF bombers also struck the Škoda Werke. The British Broadcasting Company (BBC) issued forewarnings of the raid in its Czech-language radio service in an effort to reduce the casualties that would result from the attack on a work day in the middle of the week. The raid, conducted on Wednesday, 25 April 1945, practically ended all production of the Jagdpanzer 38(t).

Variants on the Basic Jagdpanzer 38(t)

Bergepanzer 38

Bergepanzer 38 was planned as a recovery vehicle, used for towing and recovery of Hetzers immobilized in difficult terrain or damaged in battle. It was planned that every divisional company with 14 Jagdpanzers 38(t) will get one Bergepanzer 38. BMM began the design work in the summer of 1944. The basic Jagdpanzer 38(t) was modified by removing the gun, lowering the sides of the armored hull and omitting the top plate. The compartment for the two-man crew was open from the top and carried only three tubular supports for the canvas cover. There was a universal machine gun mount on the upper edge of the front plate. The machine gun was carried in the crew compartment and was mounted only when needed. The basic equipment was a massive welded girder mounted on the upper edge of the rear armor plate. In its middle it carried an eyelet for the towing cable or bar.

Another item of recovery equipment was a collapsible two-ton crane. In collapsed state it was carried on the left side of the hull, on the right side were two towing bars. The crane was meant to handle the gun, engine and other heavy pieces of equipment of the Jagdpanzer 38(t). It was mounted on three points on the upper edge of the hull. For lifting the whole vehicle, the Bergepanzer 38 carried a heavy jack with its base.

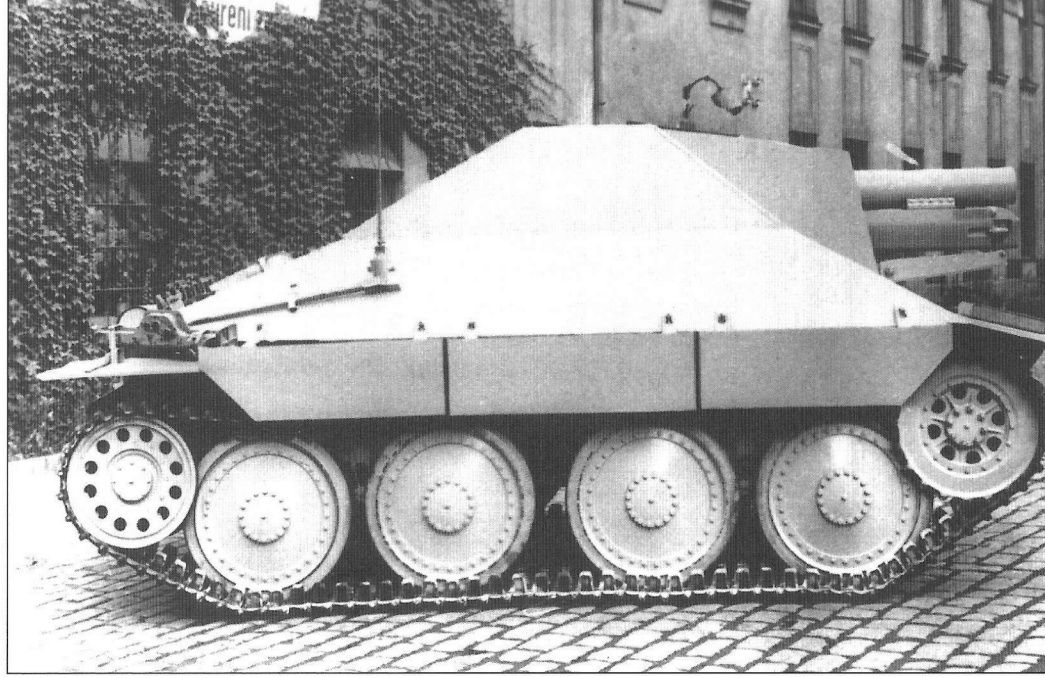
In place of the gun's lafette, the Bergepanzer 38 carried a powerful winch, manufactured by Baumgarten Company in Neuruppin. It was powered by a transfer gear from the power shaft. The towing cable was originally led to the front above the front plate; later variant had the cable outlet in the rear above the engine's cover, where it was supported by a roller.

The original production plan was for 170 recovery vehicles by the end of 1944. Beginning in January 1945, the monthly production was planned to be 70 vehicles. BMM delivered in 1944 101 vehicles, and in 1945 another 80. Thus, the planned numbers were missed by a lot, and not all companies could have been equipped with these vehicles.

Jagdpanzer 38(t) with sIG 33/2

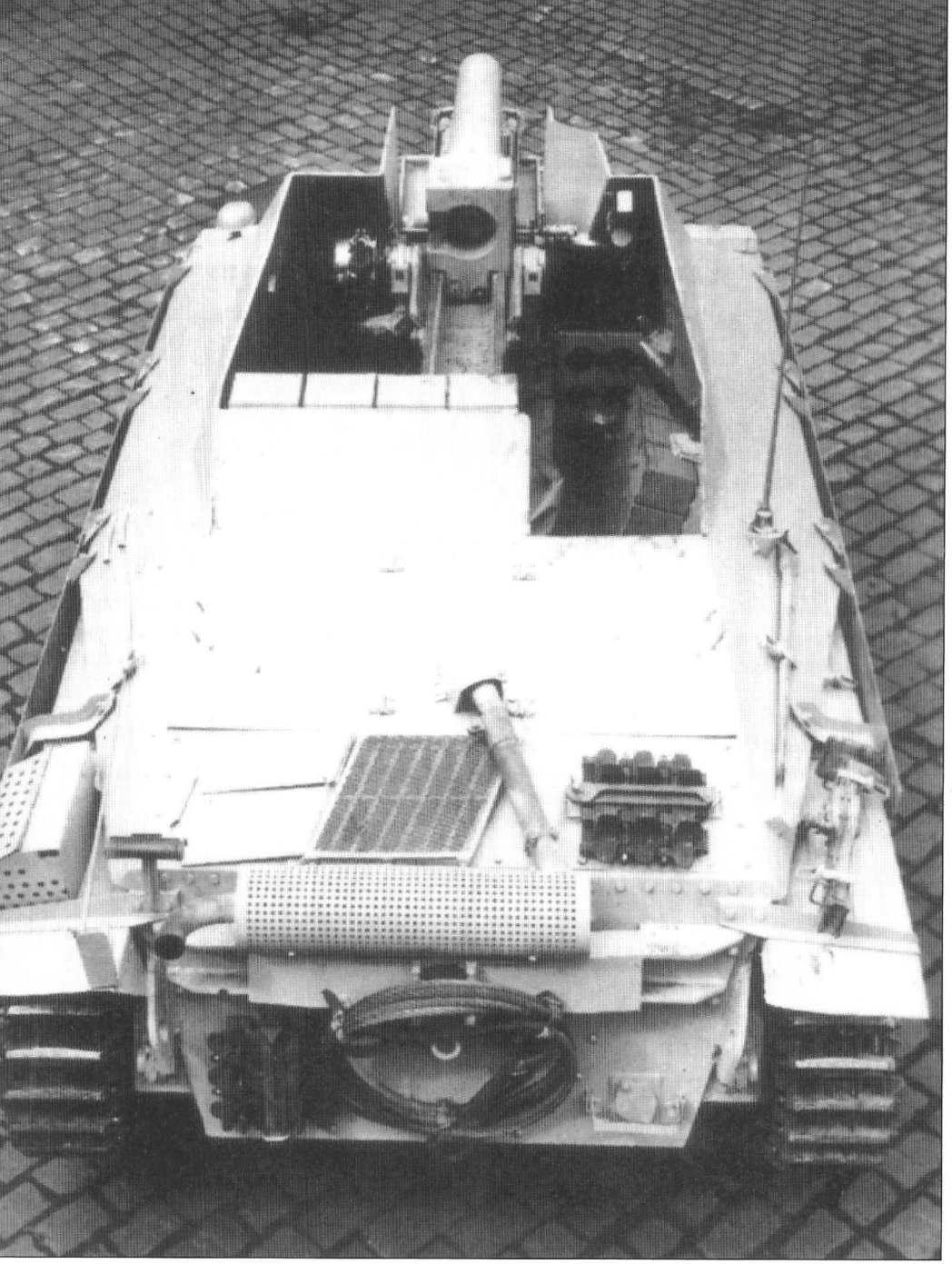
The open-top hull of the Bergepanzer 38 was also used for other modifications. In September 1944 a Jagdpanzer 38(t) from May production was rebuilt as a carrier of the infantry howitzer sIG 33/2. The gun was attached to the upper edge of the front plate, and had a limited traverse. To improve crew protection, the hull was heightened by additional 10mm armor plates, inclined to the inside. 194 - 197

The German sources list 30 thusly modified Jagdpanzer 38(t)s, six rebuilt and the rest as new production, in the period between December 1944 and February 1945. BMM documents do not list any production at all, with the exception of the prototype. It is possible that these vehicles were built on unfinished Jagdpanzer 38(t)s from BMM production by an unknown German company (Alkett?). The prototype survived the war.



This side view of the Jagdpanzer 38 with sIG 33/2 shows how the superstructure was heightened to accommodate the gun. It had a welded construction. The gun is in zero elevation.

The gun is here at maximum elevation. As on the Ausf.M gun carrier, the opening below the barrel was covered with a tilting, spring-loaded armor plate, which during transport in horizontal position helped to stabilize the lafette of the gun.



In this rear view of the vehicle with the sIG 33/2 gun at zero elevation - the cover plate below the barrel is folded flat. In the fighting compartment are visible the holders for the shells and boxes for propellant charges. The exhaust is different from the one used on the Hetzers, and is protected by a perforated cover.

Aufklärungspanzer 38 (Gerät 564)

This was another modification on the low hull. It had a three-man crew and carried the short barrel 7.5cm K51 L/24 tank gun with a similar lafette and superstructure as used for the sIG 33/2. The prototype vehicle was again produced by BMM, and at the end of September 1944 was tested in Kummersdorf. Its full production never began.

Flame throwing Jagdpanzer 38(t)

Towards the end of 1944, 20 Hetzers were rebuilt as flame-throwing tanks outside the Protectorate. The gun was removed, but its cast ball mount was retained for mounting the flame-thrower. Its nozzle was masked by a tubular gun barrel mock-up of 73mm diameter. Inside the fighting compartment were a tank with 700 l of fuel for the flame-thrower, and a pump with an output of 2,000 l/min. The flame-thrower used small igniting charges for igniting the fuel. Its range was 50-60 m.

The vehicles were assigned to a newly formed Panzer Flamm-Kompanie 352 and 353, and were sent to Army Group G, with which they participated in the Ardennes offensive in December 1944.

Jagdpanzer 38 Starr

From the first plans to produce light tank hunters Jagdpanzer 38(t) at the end of 1943, it was envisaged to arm them with 7.5cm cannon without the recoil mechanism, fast attached to the front plate of the hull. The recoil was dissipated by the mass of the vehicle. Experiments with such weapons were already conducted on various types of tanks, and were fairly successful. The weapons were easier to manufacture and less expensive. In the fighting compartment there was more room for ammunition, and they were expected to have higher rates of fire. At the beginning of Jagdpanzer 38(t) production the proven recoilless weapons were not yet available, and so the production was began with the standard 7.5cm PaK 39 gun.

Nevertheless, the variant with the recoilless gun, named Jagdpanzer 38 Starr, remained slated for production, and the development of prototypes started immediately. The first prototype was prepared in cooperation of BMM and Alkett already in May 1944. First tests of the rigidly mounted gun were performed on the artillery range close to Prague. Further tests were performed in the artillery testing center in Hillersleben.

In September 1944, BMM started work on three prototypes. The final mounting of the gun was entrusted to Alkett. One prototype had 80mm front plate, the other two 60mm. As the design was not yet ready for full production, BMM obtain order for only ten-vehicle "zero" series. The full assembly was done already at BMM, but because the planned TATRA Diesel engines were not yet ready, the vehicles were equipped with the standard PRAGA AE engines. Five vehicles from this series were shipped in December 1944, and the remaining five in January 1945. It is not known if the tank hunters Jagdpanzer 38 Starr were used in combat, but probably not, as eight of them were

registered with the School for tank Hunters in Milovice.

The full production of the 3,000 Jagdpanzer 38 Starr was planned at Škoda, but due to problems with obtaining the guns and engines, it never started. The final prototype with the TATRA eight-cylinder air-cooled Diesel engine with an output of 180 h.p. was finished at BMM in March 1945. It was shipped to Milovice, where it remained after the war ended. Another reason was the accepted low survival rate of the armored vehicles in combat.

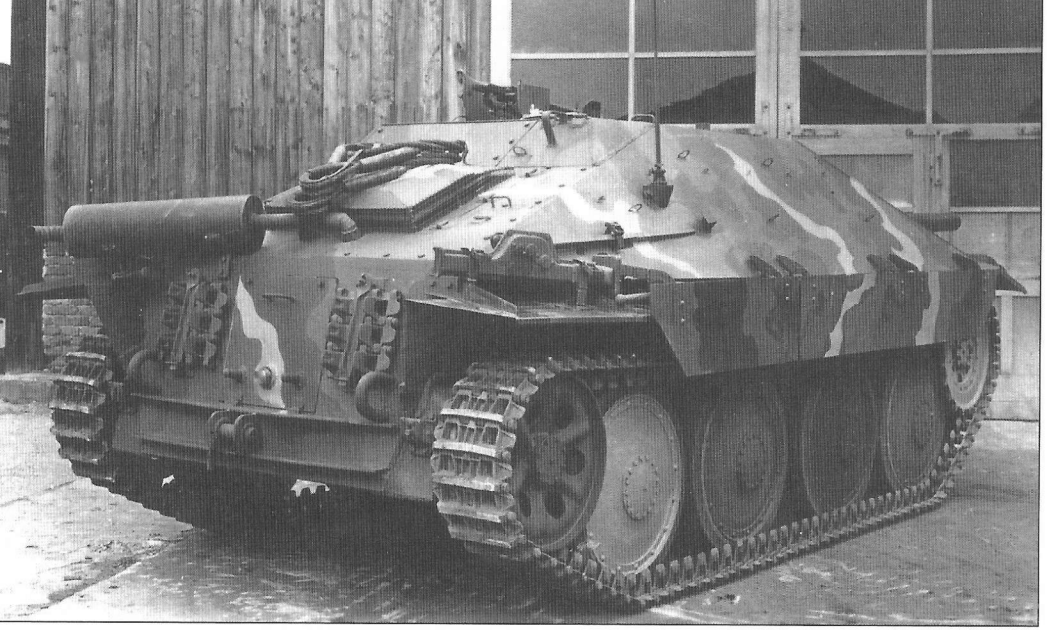
Many firing tests with the Starr vehicles, performed in Hillersleben, Berka and Milovice ranges have shown that the gun was sufficiently precise, and that its loading was faster. On the other hand, the strong strokes, carried from the rigidly mounted gun onto the construction of the vehicle, were causing many problems. Many important assemblies had shown accelerated wear, and the barrel of the gun suffered excessively fast burning of its rifling. But the significant decrease of the vehicle's service life was accepted and the program remained important. This decision may have been influence by lowering the total mass of the vehicle by almost 1,000kg, and by doubling the ammunition supply - from 38 rounds to 79.

Jagdpanzers 38 Starr were finally used operationally in the last days of the war, when the Germans tried to crush the Prague Uprising. The German garrison in Prague had available four Starrs, including the prototype with the Tatra Diesel engine. The remaining Hetzer Starrs were in the Milovice proving ground and were also used in Prague on 5-8 May 1945. The Czechoslovak Army inherited eight Starrs, but had seven of them rebuilt with the standard guns.

A captured flame-throwing Hetzer in the Ardennes in winter 1944 is checked by an American soldier. These vehicles did not carry the remotely controlled machine gun.

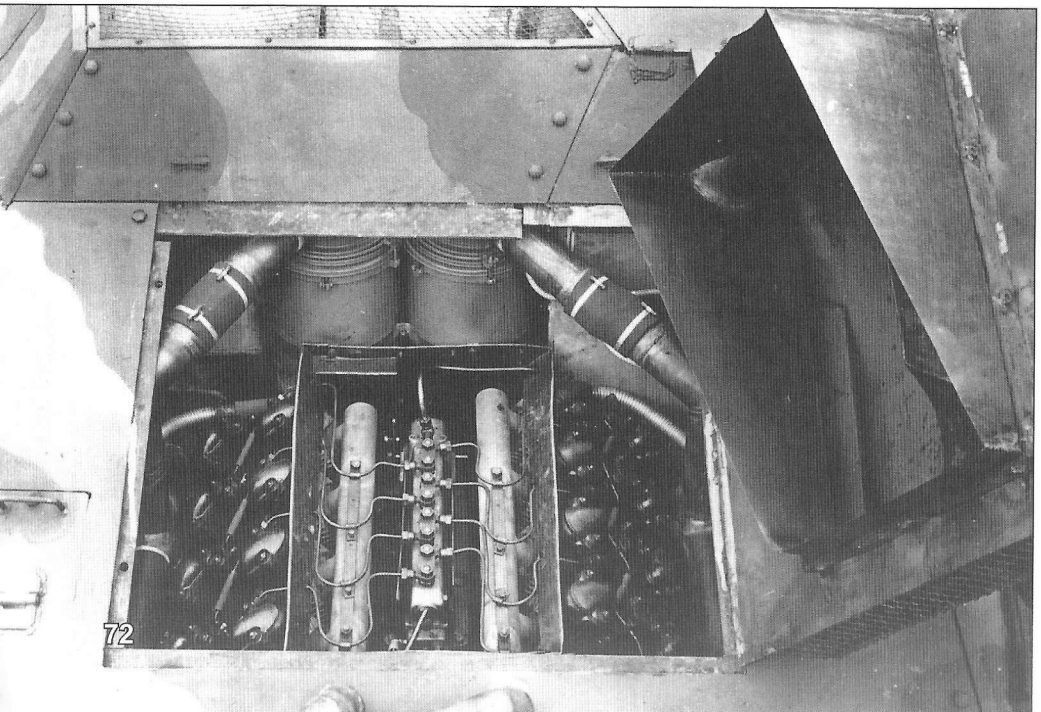
Although this flame-throwing Hetzer, captured by the American Army during the Battle of the Bulge, has the standard gun mantlet, the fake barrel does not have the usual Saukopfblende.

This frontal view of the Jagdpanzer 38 Starr shows the typical smaller mantlet and very slim extended armored cowl of the gun, which was fixed to the barrel, as it did not recoil after firing.



The final prototype of the Jadpanzer 38 Starr was finished in March 1945. All the Starr vehicles had a different arrangement of the rear plate above the engine with a different exhaust and its outlet from the engine compartment and a protected air exhaust in the middle.

The Tatra 928 eight-cylinder Diesel engine with an output of 180 h.p. in the Hetzer Starr prototype was air-cooled and had much lower fuel consumption than comparable gasoline engines.



Hetzers in Combat

The Jagdpanzer 38(t) became in the last two years of the Second World War the primary tank hunter of the infantry, mountain, rifle, grenadier and Home Guard divisions, where it mostly replaced the previous tank hunters Sd.Kfz.139, 138 and 138M. They were part of the Panzerjäger Abteilungen. Initially 14 gun vehicles and one recovery vehicle were planned, but that was later changed to 10 gun vehicles.

The worsening situation on the front, and especially the opening of the second front in summer 1944, necessitated immediate introduction of the new vehicles. The first combat unit obtained its 45 Jagdpanzer 38(t)s in July 1944. It was an independent battalion of tank hunters Panzer Jäger Abteilung 731, subjugated directly to Army Group North on the Eastern Front. It had three companies of 14 vehicles each, and headquarters with three vehicles. Vehicles of the company commanders and two of the headquarter vehicles carried on top of the standard Fu5 radio set also Fu8 set for communication with higher headquarters.

The second Panzer Jäger Abteilung 743 got its 45 Hetzers also in July 1944, and was assigned to Army Group Center. The reason why these units were allocated the Hetzers before the divisional units was an acute need for strong antitank units on the Eastern Front. Their Hetzers were used already on 2 August 1944 during the Warsaw uprising. Panzer Jäger Abteilung 731 fought in the northern part of the Eastern Front up to the end of the war, and its tank hunters destroyed hundreds of Russian tanks, trucks and guns. It obtained 10 replacement vehicles in November and 20 in December 1944. The second Panzer Jäger Abteilung 743 obtained 31 replacement vehicles as late as February 1945.

The third Panzer Jäger Abteilung 741 got its 45 vehicles in September 1943. It was divided: its 1st company was sent to the Eastern Front, but the rested was shipped to Arnhem in Holland to help with the liquidation of Allied paratoopers (operation Market Garden). This unit obtained its 12 replacement vehicles in November.

Between January and March 1945, the Hetzers were used in Panzer Jäger Abteilung 510, 561,708, 744, and Jűterborg and Schlesien units. These antitank battalions formed the reserve of a Corps or an Army and were assigned either complete or in parts to single divisions fighting on the most exposed sections of each front.

In August 1944 there were already many crews trained, and the supply of new vehicles also improved markedly. This allowed supplying the divisions they were originally meant for.

The first divisions who got their 14 vehicles were the 15th, 76th and 335th infantry divisions on the Eastern Front, and 79th and 257th infantry division on the Western front. The 97th Jäger Division also obtained its company. First Waffen SS units equipped with the Hetzers were the 20th Grenadier Division SS (1st Estonian) and 8th Kavallerie Division SS Florian Geyer, which had two companies with 29 vehicles each.

By far the strongest unit equipped with Jagdpanzer 38s was the 104th Panzer Jagd Brigade (tank hunter brigade) with six battalions, each with two companies. When the brigade was sent to Army Group Weichsel (Visla) in February 1945, it had more than 120 Hetzers. Shortly before the end of the war, the Hetzers could be found in several assault

gins brigades, independent tank hunter companies (Bock, Lang and Pankow), and even with some strange Waffen SS units.

The tank hunters Hetzer were well liked by their crews, although they had some disadvantages. First, the vehicles were cramped and the crew had to be well trained to cooperate seamlessly.

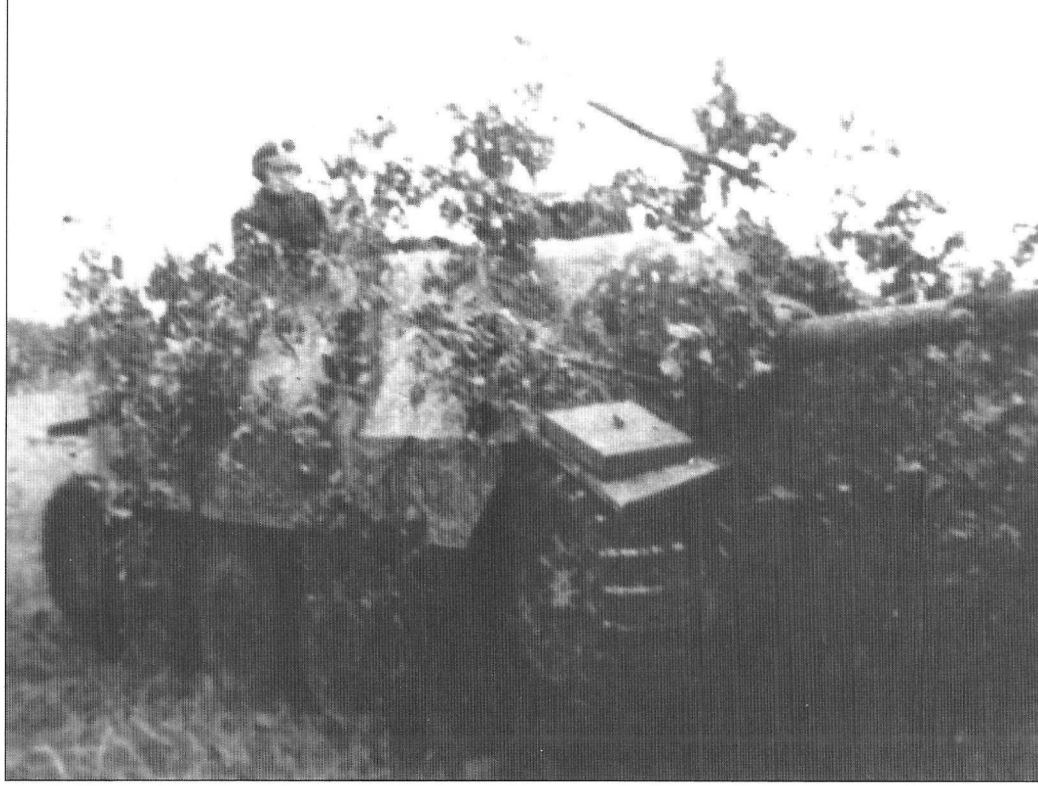
The gun was originally designed for loading from the right, but due to his position on the right, it had to be loaded from the left. The commander sat right behind it, and his vision was impaired by flame and smoke when the gun fired. The machine gun on top of the hull was effective, but as it had only a 50-round magazine, it had to be reloaded often, which exposed the gunner to enemy fire. Magazines that held both 100 and 200 rounds were tested, but were never introduced.

There were only two escape hatches in the rear of the crew compartment, which meant the front two crew members had low probability of escaping in case of a hit. The front armor was sufficient, but the sides were weak and protected only against infantry weapons. The vehicle was very vulnerable to air attacks, as its 8mm top armor could not stop high-caliber machine guns or cannons of the fighters. Finally, the vehicle had periscopes to front, rear and left side, but was blind on the right side.

The above disadvantages notwithstanding, the Hetzers were very effective tank hunters, and when used in cooperation with infantry, and utilized proper tactics, their losses were acceptable. They were fast, with an effective gun, and were very dependable.

For example the Eastern front had 502 Hetzers in April 1945, of which 352 were operational. On the Western front of 125 Hetzers 98 were operational.

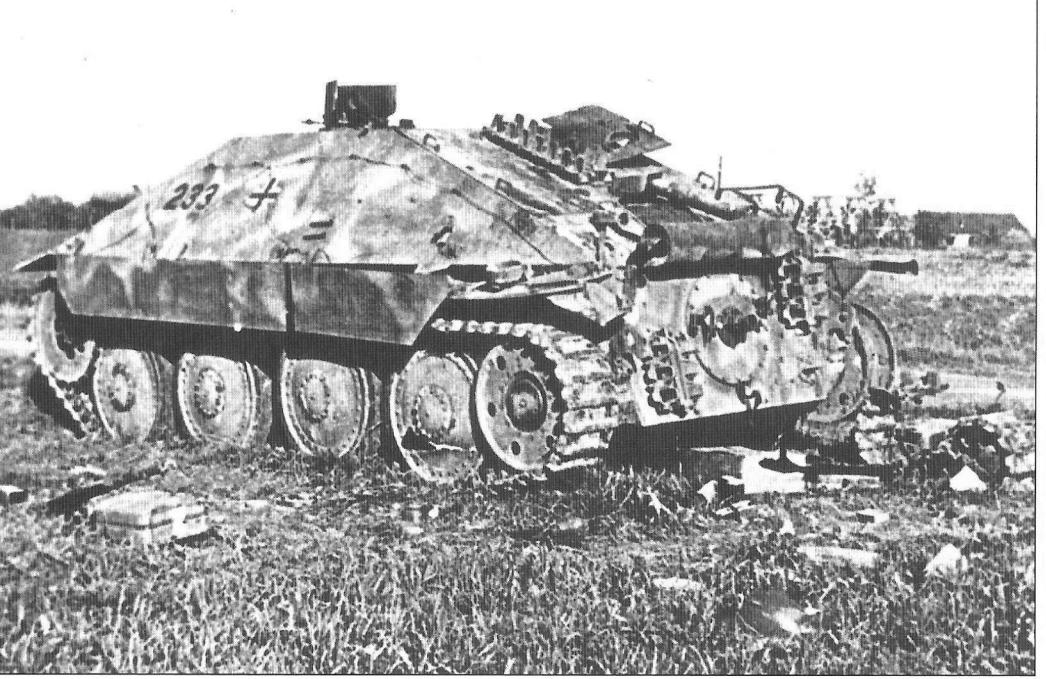
Their battle effectiveness was outstanding, and the Allies were lucky that they had to deal with them only during the last nine months of the war.



This Hetzer is thoroughly camouflaged with branches. Because of its small size and low silhouette, it was not an easy target.

A Hetzer of the Waffen SS on the western front in the summer of 1944 is painted in the base dark yellow, probably originally a vehicle of a training unit, later transferred to combat.

A hit from an American M-10 tank hunter finished this Hetzer close Halloville in France in autumn of 1944. The vehicle is camouflaged in the "ambush" scheme.

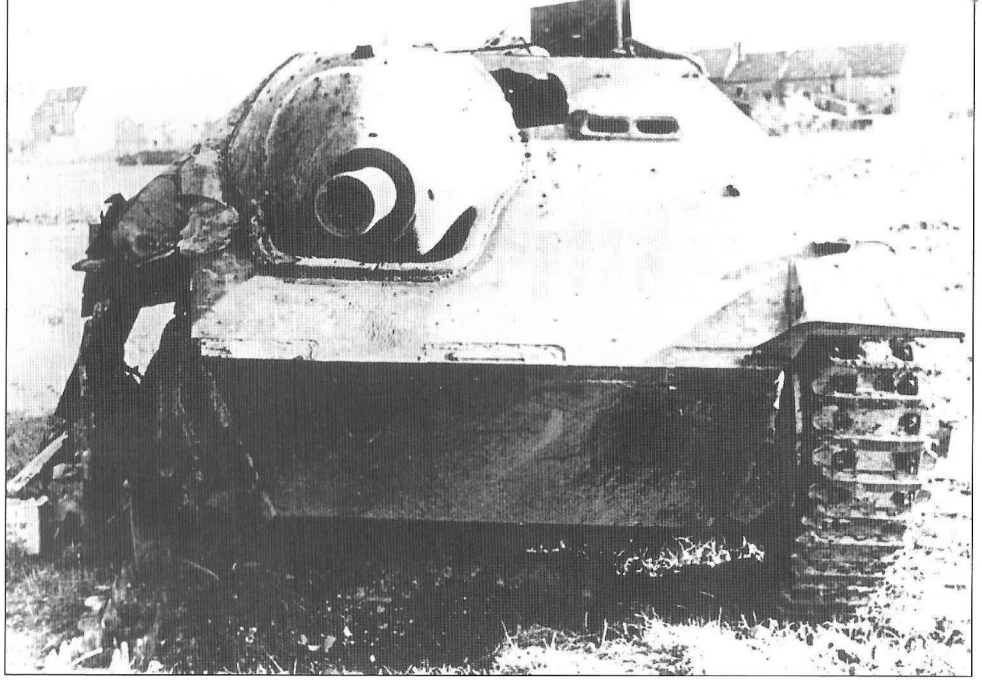


An older model of the Hetzer has been abandoned on some field on the Western Front. Aside from a thrown track, the vehicle does not show any damage.

Another victim of the fighting on the Western Front, this Hetzer has taken a hit from an artillery shell, leaving a large hole in the side of the vehicle. The 20mm side armor could not take hits like this.

An American soldier inspects a destroyed Hetzer. A part of the side armor is blown out, indicating a small internal explosion.

A Hetzer burns during a battle.



One of many Hetzers destroyed on the Western Front, this one has the cast cover for the driver's periscopes, which was soon replaced with a light tin cover, because it was a veritable catcher of the AP projectiles, which were funneled directly into the optics of the periscopes.

Hungary obtained 75 Hetzers in late 1944 and early 1945 for its assault gun battalions. Its 1st Cavalry Division got another 10 in Poland, and 26th Division nine. This Hetzer was destroyed at the end of 1944 during heavy fighting before Budapest.

This Hetzer was destroyed by the Red Army during the fighting in Hungary in the spring of 1945. The vehicle named "Marika" belonged to the Hungarian Army.

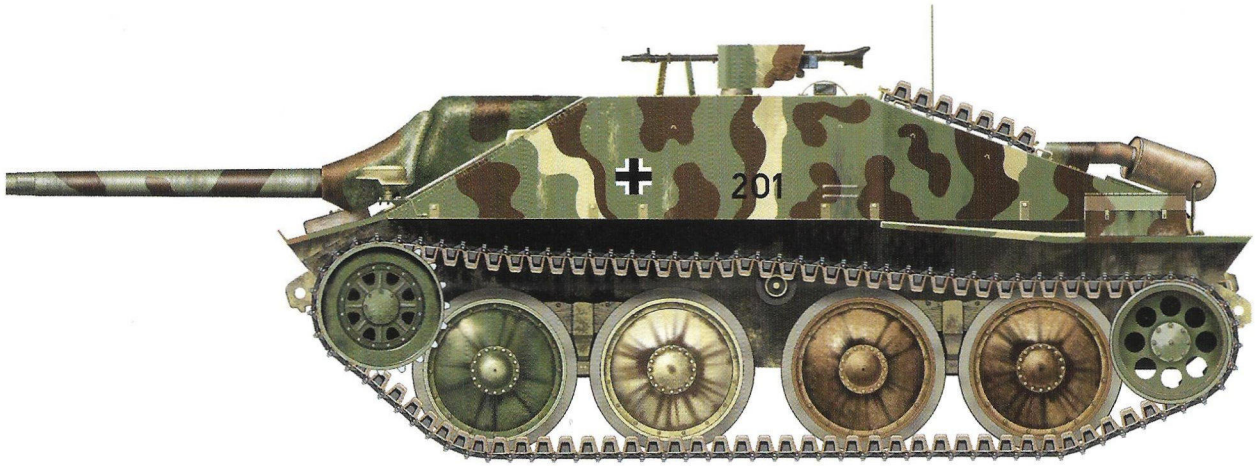
In December 1944, Bulgaria formed its 1st Army to fight alongside the Red Army. Its armored drujina was equipped mostly with captured German tanks and assault guns, and had also four Hetzers. Here Bulgarian tankers are inspecting one of them.

Jagdpanzer 38 "Armin"

Nicknaming armored vehicles was an exception in the German Wehrmacht. The name "Armin" had been painted just in front of the national marking. The Hetzer is camouflaged in an usual pattern of Dunkelgelb RAL 7028 (dark yellow), Olivgrün RAL 6003 (olive green), and Rotbraun RAL 8017 (red brown). This Jagdpanzer 38, which was damaged by Czech combatants in Prague, belonged to the Kampfgruppe Reimann (combat group Reimann).

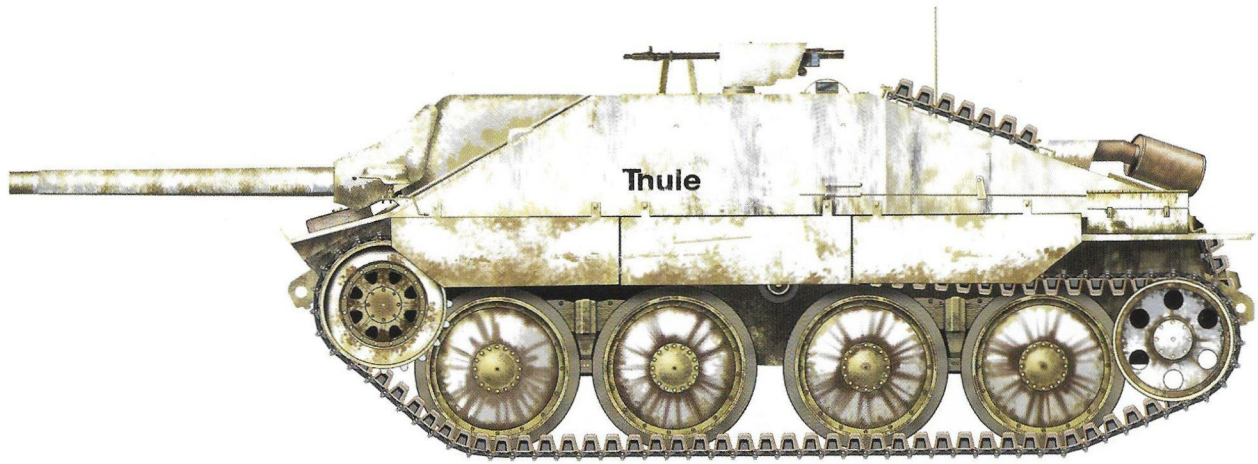
Jagdpanzer 38 "Black 201"

This Jagdpanzer 38, "Black 201," saw action in Bohemia (Czechoslovakia). The Balkenkreuz (beam cross) is outlined in white, but the tactical number is not outlined.



Jagdpanzer 38 "Thule"

This winter-camouflaged Jagdpanzer 38 was named "Thule" by its crew. The Hetzer took part in the defense of Berlin in April 1945 before it fell victim to the Red Army.



Late-War Developments

As already mentioned, in autumn 1944 Adolf Hitler decreed that all new production of Jagdpanzers and self-propelled guns would be based on 38(t) and 38(d) chassis. The 38(t) was to continue in production at BMM and Škoda Werke as the Hetzer, Hetzer Starr, sIG (sfl) and Aufklärungspanzer.

The 38(d) (d = deutsch or German) was a slightly larger redesigned version of the Hetzer. It differed mainly by using the new 220-h.p. TATRA 12-cylinder, air-cooled Diesel engine, a new drive train, and new drive and sprocket wheels. This redesigned Jagdpanzer 38(d) was supposed to weigh 16 tons with 80mm frontal armor. The new engine would give it a maximum speed of 42km/hour and range of 220km on good roads. It was large enough to accommodate the 7.5cm PaK 42 (L/70), and thus could replace the Pz.IV/70. Alternative weapons were PaK 39 (L/48) and StuH 42, so that the vehicles could replace StuG III. Only prototypes were built, but it was planned from mid-1945 that Alkett, Vomag, Krupp-Gruson, MIAG and Ni-Werke would be producing 1,250 units per month.

In addition to the Jagdpanzer vehicles, the 38(d) was intended as a replacement for the Kugelblitz when Pz.IV chassis was terminated. It was to use a small turret with the formidable armament of two 2cm MG cannons and two 3cm MK 103 cannons, controlled by one crew member. The hydraulic traverse and elevation permitted 45° per second movement. This vehicle existed only as a wooden mock-up.

In 1944 a specification was issued for a fully tracked personnel carrier based on a lengthened 38(d) chassis. The addition of a fifth road wheel increased the length of the vehicle to 6.2 meters. The armor was 30mm in front and 20mm on the sides. The vehicle carried a hemispherical turret with a multi-purpose 2cm gun and a crew of four. It could carry eight men in the rear section. Weight was planned at 12 tons and speed with the TATRA engine 30km/hour, with a range of 200km. Only a mock-up was built in 1945.

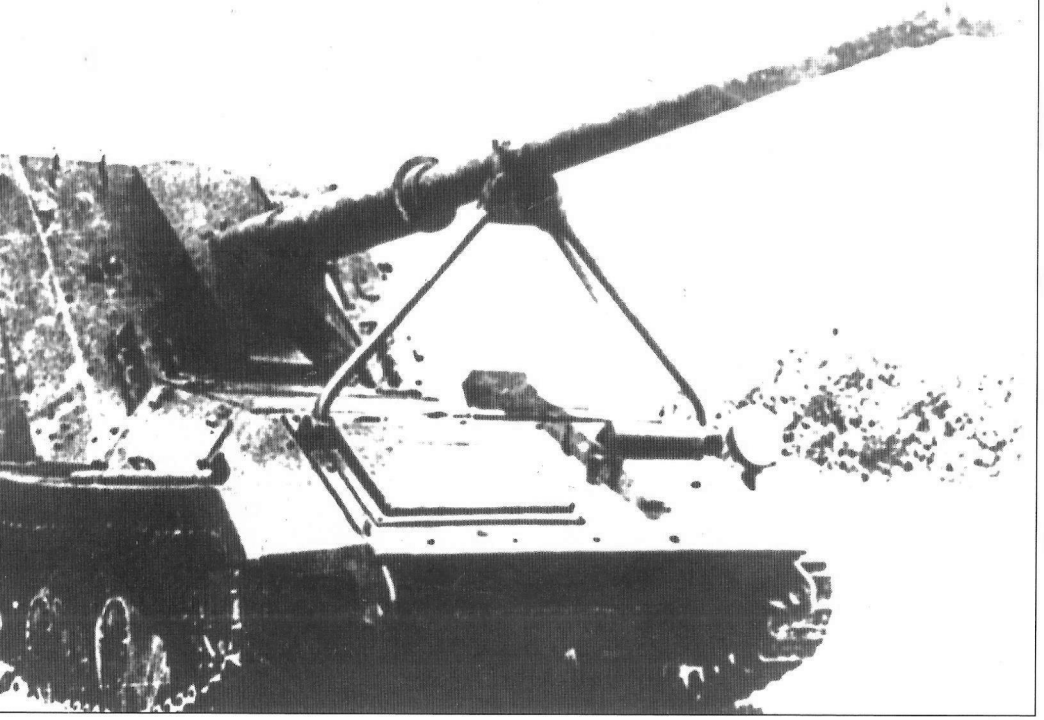
Leichte Einheitswaffenträger

In the second half of the Second World War, the Germans began planning development of self-propelled artillery. The use of tank hunters, carrying the 7.5cm Pak 40 mounted on a fully tracked chassis, had shown the advantages of such combinations. The gun was much more movable, was always ready to fire at short notice, and the body provided some protection to the crews against infantry weapons and splinters. The new program was designed to develop gun carriers for other types of gun, which until that time were using prime movers for transport.

The initial large and complicated designs for Waffenträger (gun carrier) based upon the Pz.III/IV chassis were built during 1943. Then Wa.Prüf.4 decided that these were too heavy and costly to equip all units of self-propelled artillery. In February 1944 a new specification was issued for a Waffenträger to replace the towed artillery weapons. The gun had to be dismountable from its a low rear platform without special equipment. With 360° traverse, gun elevation was specified at -8° to +45°. Other requirements were

During the Prague uprising, Czech insurgents captured this finished Hetzer at the Škoda factory on 5 May 1945. More Hetzers were captured, but most were without guns.

Featuring different camouflage patterns, these remnants of various Hetzers on a field near Nové Město in Moravia in the summer of 1945 were captured from Army Group Center, which had surrendered in Bohemia in May that year.



A production version of the Ardelt vehicle is seen here.

Another prototype of leichte Einheistwaffenträger Krupp II with 8.8cm PaK 43/3 was built on Jagdpanzer 38(d) chassis and powered by the Tatra Diesel engine.

a machine gun for close defense, a radio set, a maximum speed of 35km/hour, a range between 100km and 150km, and a minimum of 50 rounds for the gun to be carried on the vehicle. Krupp was given overall responsibility for the whole project, with Rheinmetall developing the guns and Ardelt and Steyer developing the chassis. Front-wheel drive was chosen, as it allowed a lower gun platform. Steyer proposed a vehicle with its running gear based on the Raupenschlepper Ost (R.S.O.), but the Ardelt design, based on the 38(t) chassis, was accepted for production. The engine and drive-train were placed beside and in front of the driver, whose cupola fold to allow larger depression of the gun. Two guns were originally selected for mounting on the Eiheitwaffenträger: the 10.5cm leFH 18/40/5-GW630/26 (Gerät 587), and the 15cm sIG 33/2 -GW638/27 (Gerät 588).

Prototypes based on the 38(t) chassis were built in late 1944. In this version the vehicle with the 10.5cm gun had a weight of 13.5 tons, a length of 6.35 meters, a width of 3.16 meters and armor between 20mm and 10mm thick. Its crew consisted of four men, and its PRAGA engine gave it a top speed of 35km/hour.

The total production was planned to run at 1,250 units per month. If this quantity had been attainable, it would certainly have changed the use of all types of artillery. But producing and fielding such numbers was just a pipe-dream in the spring of 1945, when German industry lay in ruins, when raw materials and labor were in short supply, and when even those vehicles that were produced lacked gasoline, ammunition, and crews. As with other promising developments at the time, it was already too late for Germany.

Production was set to begin in spring 1945, with 350 units to be turned out per month by September 1945. Production vehicles were planned on a 38(d) chassis with its more powerful Tatra 103 air-cooled Diesel 220 h.p. engine and the new drive-train. A prototype of this Waffenträger, based on 38(d) chassis and mounting the 8.8cm PaK 43, was built and successfully tested at Hillersleben as late as 27 April 1945.

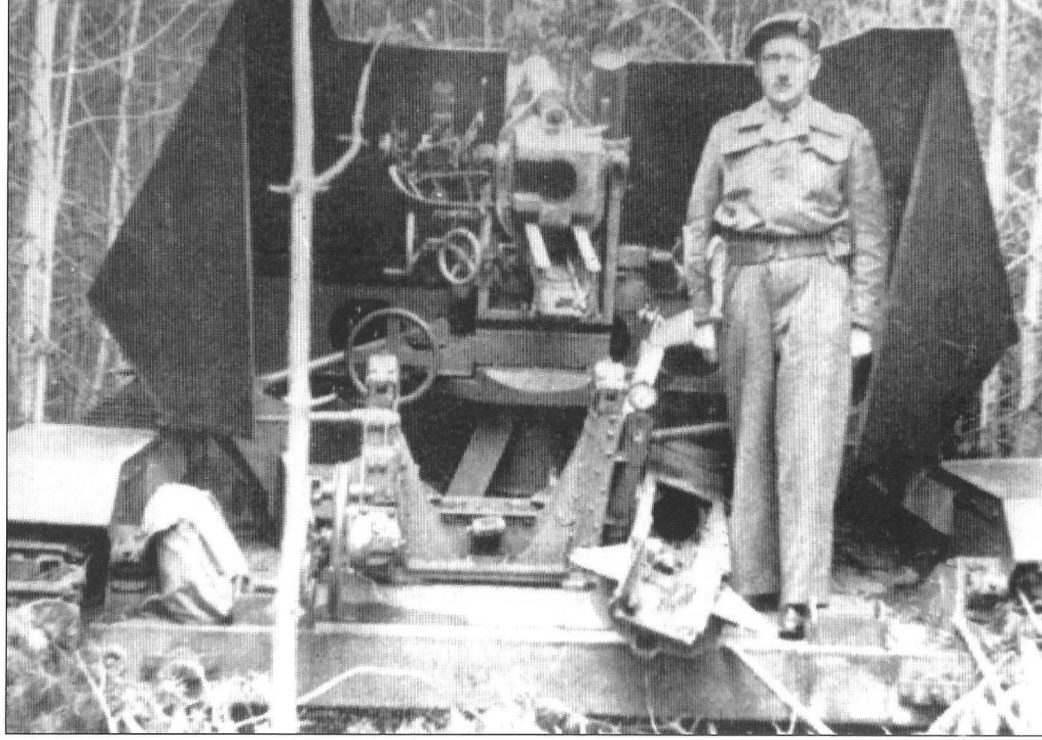
Mitlere Einheitswaffenträger

From autumn 1944 this project was being developed simultaneously with the Leichter Waffenträger so as to have more possibilities for the guns mounted. The vehicle was longer, with 6 wheels per side, and was known as Krupp I, while the four-wheel vehicle was known as Krupp II. The models proposed were as follows:

10.5 cm leFH 18/40/5 - GW 638/21 (Gerät 578)
15 cm sIG 33/2 - GW 638/20 (Gerät 577)
12.8 cm K 81/3 - GW 638/22 (Gerät 579)
15 cm sFH 18/6 - GW 638/23 (Gerät 580)

Certain problems arose with the length to width ratio and the design was not adopted for production before the end of the war. Prototypes were again built using 38(t) and later 38(d) chassis, which was envisaged for production vehicles. Armor was between 10 and 20 mm and weight was dependent on the type of the gun carried. With the 10.5 cm gun it was 13 tons, with the 12.8 cm gun 15.8 tons. Mounting the 8.8 PaK was also planned.

In the rear is the Rheinmmetall-Borsig prototype of a leichte Einheitswaffenträger Krupp II with 8.8cm PaK 43/3.



The mitlerer Einheitswaffenträger Krupp I with 10.5cm leFH 18/40 is seen from the rear. The vehicle is wider than the original Pz.Kpfw.38(t) chassis.

The Krupp-Steyr Waffenträger prototype was built using components of the Raupenschlepper Ost (RSO) – specifically the transmission, suspension, and tracks. It was intended to compete with rival Ardelt designs.

This fully restored Pz.Kpfw.38(t) Ausf.C is on display at the Military Museum in Lešany close Prague. It is painted in the pre-war Czechoslovak Army camouflage scheme. The Czechoslovak Army had after the war 29 LT 38/37 tank on its roster, and even used them in fighting against the Ukrainian "Bendera" groups in Slovakia. Most of them were scrapped in the second half of the Fifties. Two of them were saved. One is used as a monument of the Slovak National Uprising in Bánska Bystrica in Slovakia. The second was transferred to the Military Historical Institute in 1959. After full restoration, it is exhibited by the Military Technical Museum in Lešany in Czech Republic. In all probability, it is the only running example of this type in the whole world.

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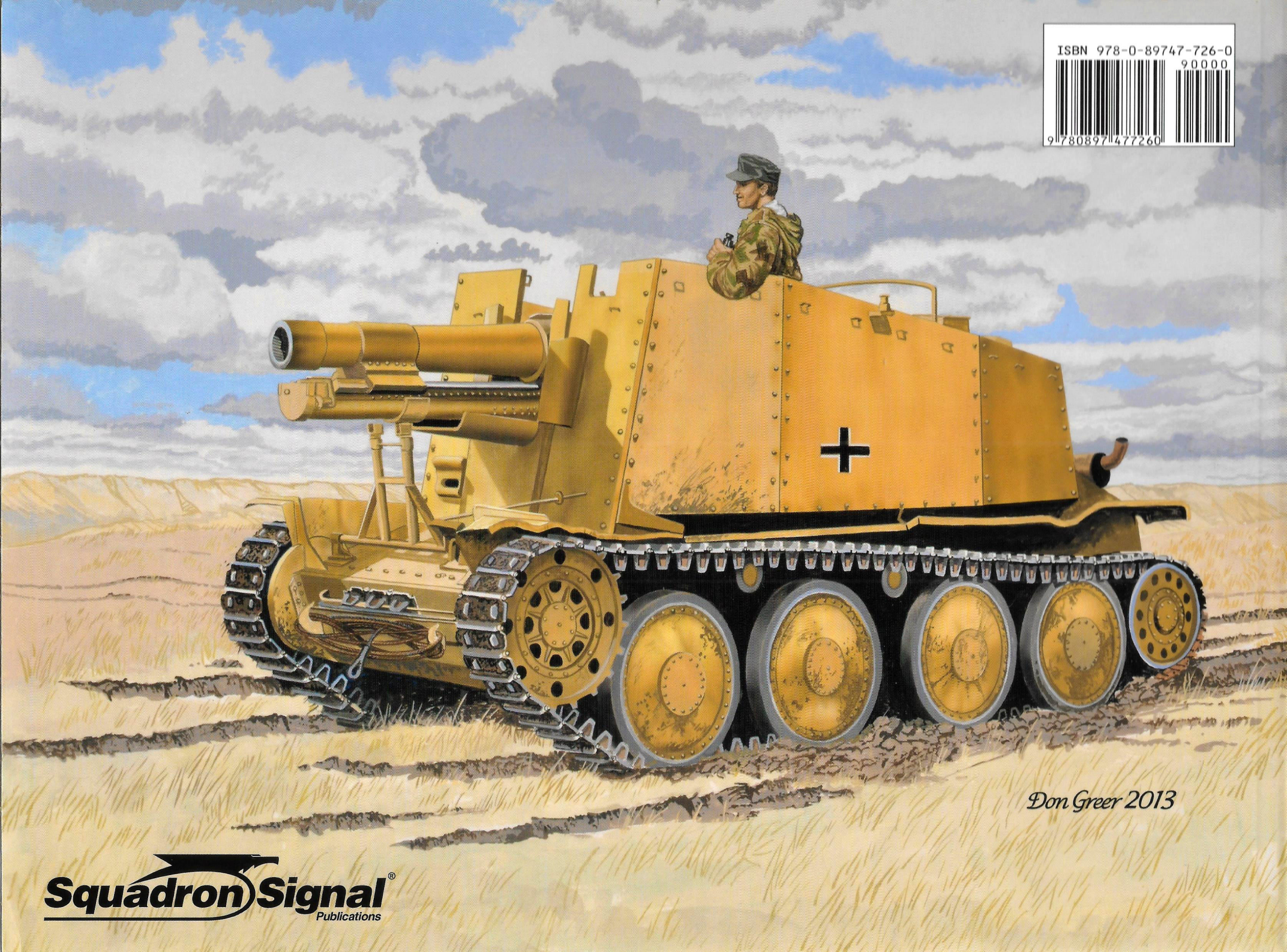

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